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[OFFICIAL NOTICE.]

Fifteenth Annual Meeting, Western Gas Association.

SECRETARY'S OFFICE, WESTERN GAS ASSOCIATION,
QUINCY, ILLS., April 4th, 1892.

The Fifteenth Annual Meeting of the Western Gas Association will be held at Detroit, Mich., on the 18th, 19th and 20th days of May. The Russell House has been designated by the Committee of Arrangements as the headquarters of the Association, while the business sessions will be conducted in the Armory of the Detroit Light Infantry, two blocks distant from the Russell House. The proprietor of the Russell House, Mr. W. H. Chittenden, will take pleasure in reserving rooms for those who may apply in advance of the date of the meeting; and as the gentleman in question, aside from being the proprietor of the hotel, is also one of the Directors of the Detroit Gas Light Company, he will personally see to it that our members are housed in the way that gas men should be accommodated. The Russell House is conducted on the American plan, and the rates for members in attendance, their families and friends, will be $3 per day and upwards, according to location of rooms.

Your Secretary takes this occasion of stating that although no published announcement of the fact has heretofore been made, the special committee for the assignment of papers assembled at St. Louis on the 20th of January last and prepared a list of topics, treatises on which the committee believes will be of interest and value to our members generally. The authors as designated by the committee, almost without exception, acquiesced in the allotment, and several of the papers are already in the hands of your Secretary, while the rest are promised not later than the 25th of the current month, thus giving ample time for printing and illustrating.

It is this manifestation of willingness and zeal for the welfare of "The Western," and hearty and favorable response to requests for the preparation of papers, that lighten the labors of the officers of the Association and contribute so much to a successful meeting.

While the "Question-Box" has long since lost the charm of novelty, there is a feeling on the part of many of our members that our Association has never given this feature of its proceedings the prominence to which its importance entitles it. It has been suggested that we use our best efforts to make this one of the leading features of the Detroit Meeting. It is presumed that the main reason why the Question-Box has been slurred over with us in the way that it has is because the queries were usually put on the spur of the moment, and were as hastily, and, therefore, unsatisfactorily, answered. It is, therefore, recommended that on this occasion our members be requested to send to the Secretary, as far in advance of the date of the meeting as possible, the questions to which they wish replies. Such queries will be promptly announced in these columns, unaccompanied by the names of the senders, thus enabling those who desire to reply to properly prepare and duly weigh their answers before taking the floor for that purpose.

The annual membership list is now in the printers' hands; and each of our members should receive a copy by the 20th of this month. Should any fail to do so, kindly notify the Secretary and the omission will be cheerfully supplied. Application blanks will be mailed to those who may be desirious of joining our Association at its next meeting.

A. W. LITTLETON, Sec.

THE SOCIETY OF GAS LIGHTING, at a regular meeting held on the afternoon of the 14th inst., voted a subscription of $250 to the fund for the erection and equipment of a building wherein the value and utility of gas shall be displayed at the Columbian World's Fair Exhibition.

BRIEFLY TOLD.

THE WORLD'S FAIR AND THE GAS INDUSTRY.—The Gas Industry Council has distributed broadcast within the fortnight a carefully compiled circular, in which is plainly put forth the reason—indeed, we might well use reason in the plural, for several are advanced—why gas companies, manufacturers and dealers should subscribe to the fund for a suitable building, and its appropriate equipment, at the World's Fair, wherein gas and its uses may be shown to advantage, and with independence. The circular notes that the Council must formally pledge to the World's Fair authorities that the gas industry *shall* erect a building on the site assigned—this is shown in a well-drawn diagram on one of the circular sheets. In this connection we may also note that the dimensions of the plot are 380 feet by 150 feet, instead of 300 by 150 foot plot originally assigned—which leads us to remark that small favors are appreciated, more especially as the favors so far accorded the industry by the Commissioners have been small enough in all conscience. However, the duty of the day and time is to subscribe. Money talks, and talks most convincingly. The circular also formulates a plan of subscription

for the allied industries, which is based on the payment of an amount equal to 3 mills on each dollar's worth of business done during the past year, which looks to us to be ample, though not excessive. We repeat, subscribe—liberally, and at once.

MR. EGNER ADDS A "REASON."—The following letter to the JOURNAL, written by Mr. Frederic Egner under date of the 13th inst., explains itself:

"I have before me a circular of the Gas Industry Council, dated the 9th inst., which gives eleven good reasons why gas companies, manufacturers and dealers should subscribe to the fund necessary to insure a proper representation of the gas industry at the World's Columbian Exhibition. One very good—and it ought to be a convincing—reason is not given; and as the gentlemen composing the Council are not likely to give it, I trust I may be excused for giving it for them; and your readers, at least the large majority of them, will indorse this reason, knowing it to be true. The only trouble about anything of this kind is that what everybody knows is apt to be overlooked. Now, in this matter it is very important that it should be remembered and promptly acted upon. Here, then, is the additional reason why gas companies, manufacturers and dealers should subscribe as called upon. The members of the Council who recommend favorable action in this matter are all, personally, well and favorably known to the large majority of the gas men throughout the land. All but two are known to be at the head of successful gas companies, the prosperity of which is largely due to the individual exertions and direction of these same gentlemen; and the two exceptions are no less distinguished in their occupations as manufacturer and constructing engineer respectively. It is generally acknowledged and known that the names of the gentlemen forming the Council are synonyms for progress, good management and success in the gas industry; hence their recommendation may be safely acted upon by 'all whom it may concern.'"

SECRETARY SLATER has notified the members of the Council of the American Gas Light Association that a meeting of the Council will be held in Detroit, Mich., on Wednesday, May 18, 1892, at an hour hereafter to be determined upon, due notice of which will be given. It is important that the members be present, as matters of moment are to be considered.

NOTES.—Mr. Thomas H. Thomas has been chosen a Director in the Citizens Gas Light Company, of Brooklyn. He is a progressive man. ——Messrs. John W. Steinhart and E. A. Rudiger have purchased a controlling interest in the Nebraska City (Neb.) Gas Company. They will make important plant betterments.——In our item columns will be found some extracts from the annual report of the Directors of the Montreal Gas Company. At the shareholders' meeting the report was accepted and the retiring officers were all reappointed. The Company also adopted a resolution to issue $150,000 in bonds (5 per cent., to run for 15 years) for the purpose of providing a fund for important plant extensions. The betterments will, it is calculated, put the plant where it will be equal to all demands upon it for several years.——The Gas Light Company of Syracuse, N. Y., has awarded a contract for the construction of a double-lift gasholder (to be inclosed in a brick house) to the Continental Iron Works, of Brooklyn, N. Y. It is to be 102 feet in diameter, the lifts to be 20 feet 6 inches. The connections are to be 20 inches in diameter. The Company will also erect a coal storage house, of stone and brick, with slate roof. Its dimensions will be 160 feet by 50 feet, and it is rated to store 4,000 tons of coal. When the new holder is completed—about October 1st—the Company's storage capacity will equal the retention of 1,045,000 cubic feet. Surely, Brother Wood has lively times ahead of him this summer.

The Market for Gas Securities.

The market for city gas shares developed unexpected strength during the week. Consolidated closed yesterday (Thursday) at 114 bid, and Equitable was bid for at 145. Mutual is also stong, at 137 bid. Brooklyn shares are also all higher, with marked inquiry for Nassau and Citizens. The latter is at 106, while 140 is freely bid for Nassau. There is nothing particularly new in the progress of the consolidation plan. The Equity Construction Company seems to have convinced the Equity Gas Light Company that honesty is the best policy, and construction work is actively underway. Messrs. Fanshawe and Hetfield deserve credit for the manly stand taken by them in this affair. Chicago gas is at 78¼ to ⅜, and we will venture the prediction that this stock will sell at par before the opening of the Fair. Baltimore Consolidated maintains the rise recently reported.

[OFFICIAL REPORT—REVISED BY THE SECRETARY—CONCLUDED FROM PAGE 530.]

EIGHTH ANNUAL MEETING OF THE OHIO GAS LIGHT ASSOCIATION.

HELD AT COLUMBUS, O., MARCH 16 AND 17, 1892.

SECOND DAY—AFTERNOON SESSION.

The Secretary then read the following paper, by Mr. Frederic Bredel, of Milwaukee, Wis., on the subject of

THE DETERMINATION AND REGULATION OF THE PROPER PROPORTIONS OF PRIMARY AND SECONDARY AIR AND STEAM IN REGENERATIVE FURNACES.

To determine the amount of H_2O and primary and secondary air required for recuperative furnaces (simple generator furnaces without recuperation we will not consider) let it be first clearly understood what kind of gas is wanted.

If it were a question of making a generator gas containing the largest amount of combustible gases, a large percentage, say, about 60 to 70 per cent. of steam or water would be best; but the initial temperature (*i. e.*, the temperature at which it leaves the generator or enters combustion chamber) would be extremely low, and the loss of heat carried away by the reformed steam, after combustion excessive. Another drawback is the large volume occupied by H and H_2O vapor, while CO, respectively CO_2 and CH_4 respectively, 2 H_2O plus CO_2 occupy a much smaller volume for the same heat units. It would, therefore, be best to make no H at all, if such were possible; but to prevent the fluxing of the iron and silica contained in the ashes of the coke, and thereby forming an extremely hard and heavy clinker, it is necessary to use H_2O under the grate. The introduction of steam is absolutely useless and extravagant, as there is enough waste heat from the recuperator and reflected heat from the grate and fire above the ashpan to evaporate all the water necessary to prevent said hard clinkers.

It would, theoretically, make no difference if all the carbon were immediately burnt to CO_2 and no secondary air used, but as we could then not use the recuperation to good advantage, it is not practicable, and as we want to use the recuperation for secondary air as much as possible (or give it as much work to do as possible) the generator gas containing the largest amount of combustible gases with the smallest amount of H would be the best, or a gas about like the gas in No. 3 of the following analyses:

Another advantage in having large amounts of combustible gases in the generator gas is the easier adjustment of secondary air—larger amounts being required, and, therefore, less waste in per cent., by giving, say, 1,000 cubic feet too much or too little secondary air per 24 hours.

The more CO_2 the generator gas contains the less its heating value, but the higher the initial temperature; or, in other words, what is gained by the amount of heat units, if the gas contains a small amount of CO_2, is lost by the lower initial temperature of the gas when it enters the combustion chamber; and with good primary air recuperators 1 to 7 per cent. CO_2 is not objectionable.

It must always be remembered that the gas is used and burned at the same temperature that it leaves the generator and not, as with water gas or Siemen's gas, cooled down to a certain temperature (generally from 70° to 110° F.).

Analyses Nos. I and II are with coke containing 92.7 per cent. carbon; and analysis No. III. is with coke containing 93 per cent. carbon, and 0.3 per cent. sulphur, or about the average coke from Westmoreland coal.

In instances I. and II. coke was fired cold, and no recuperator for primary air; in instance No. III. coke was fired hot, and primary air heated to about 750° F.

In making the necessary calculations it was supposed that the air consisted of 21 volumes per cent. O, and 79 volumes per cent. N., no consideration being given to the amount of water vapor or CO_2 carried. In all cases the amount of S contained in coke was considered as carbon.

To make the calculation more easy I have used the metric system throughout, and everything is per 1,000 kg.* coke used for fuel, or about the amount of coke used in instances I. and II. for a bench of 8 retorts, and in instance No. III. for a bench of 9 retorts, making 10,000 feet of gas per retort per 24 hours.

ANALYSES NOS. I. and II.—1,000 *kg. coke containing* 92.7 *per cent. carbon and sulphur.*

* 1 kg. equals 2.2046 lbs.; 1 cubic meter equals 35.316 cubic feet.

The following are analyses of generator gases obtained by using cold coke. No. I. is without addition of water; No. II. is with addition of water under grate. The H contained in the gas of No. I. comes from the water in the coke.

	No. I.	Vol. Per Ct.	No. II.	Vol. Per Ct.
CO_2..	109.4 cu. meters.	2.0	355.4 cu. meters.	6.9
CO...	1,608.2 "	29.4	1,339.0 "	26.0
CH_4..	trace	trace	20.6 "	0.4
H....	103.9 cu. meters.	1.9	720.0 "	14.0
N....	3,648.5 "	66.7	2,719.0 "	52.7
Total	5,470.0 cu. meters.	100.0	5,154.0 cu. meters.	100.0

Calorific value = 5,175,000 C.; or 69 per cent. of the value of coke. The water contained in the coke was 83.78 kg.

Calorific value, 6,120,000 C.; or 82 per cent. of coke value. The water added and contained in the coke amounted to 613.81 kg.

The amount of oxygen contained in the gases is as follows:

913.5 cubic meters. 1,024.9 cubic meters.

The amount of oxygen in water amounts to:

73.8 kg. = to 51.5 cubic meters O. 545.6 kg. = 380.6 cubic meters O.

The amount of oxygen furnished by primary air for formation of CO and CO_2:

862.0 cubic meters. 644.3 cubic meters.

Plus oxygen, used for formation of clinkers,

107.0 cubic meters. 79.0 cubic meters.

The total amount of primary air used was—

4,618.0 cubic meters. 3,442.0 cubic meters.

The amount of air necessary for combustion would be as follows:

	Cu. Meters.		Cu. Meters.	Cu. Meters.		Cu. Meters.
CH_4..	0.0	require..	0.0 O.	20.6	require.....	41.2 O.
CO...	1,608.2	" ..	804.1 O.	13,339.0	"	669.5 O.
H....	103.9	" ..	52.0 O.	720.0	"	360.0 O.
Total O required....			856.1			1,070.7

Equal to air—

4,077 cubic meters. 5,099 cubic meters.

The product of combustion would be—

84 kg. H_2O. 614 kg. H_2O.

1,718 cubic meters CO_2. 1,718 cubic meters CO_2.

6,869 { 3,648 cu. meters N in primary air. 3,221 cu. meters N in secondary air.

6,747 { 2,719 cu. m. N in primary air. 4,028 cu. m. N in secondary air.

Or total amount of air required for complete combustion—

8,795 cubic meters. 8,541 cubic meters.

Or, in percentage of primary and secondary air required—

Primary air.. 52.5 per cent. 40.3 per cent.

Secondary air 47.5 per cent. 59.7 per cent.

ANALYSIS No. III.—Coke used contained 93.0 per cent. C; 0.3 per cent. S; and 6.7 per cent. ashes. The amount of coke used was 1,000 kg. The amount of water used and decomposed in generator to help form CH_4 and H, and give up free O, to form CO and CO_2, was 300 kg., in addition to taking about 10 kg. water to help form soft clinkers. The air used to help form CO and CO_2 and N in generator was 3,376 cubic meters. In the analysis no consideration was paid to the amount of air used, extra, to form clinkers, of which later. Composition of gas obtained from 1,000 kg. coke and necessary amount of H_2O and air.

			Calories per Cu. M.	Total.	Vol. Per Cent.
40 kg. =	55.5 cubic meters.	CH_4	8,540	474,800 cal.	1.19 CH_4.
1,958 kg. =	1,560.9 "	CO	3,050	4,758,000 "	33.54 CO.
23 kg. =	256.6 "	H	2,580	662,500 "	5.52 H.
224 kg. =	113.7 "	CO_2			2.44 CO_2.
3,350 kg. =	2,667.3 "	N			57.31 N.
	4,654.0 cu. meters generator gas.			5,895,300 cal.	100.00

Or, 78.2 per cent. of the calorific value of coke, if the gas were cooled down to 65°. The balance of heat is used to heat up the generator gas, and, therefore, not lost, except the amount lost to make chemical changes in the fuel.

By weight the composition of gas would be as follows:

For CH_4, 30 kg. carbon, plus 10 kg. H.

For CO, 839 kg. carbon, plus 1,120 kg. O.

For CO_2, 64 kg. carbon, plus 162 kg. O.

The 300 kg. water, when decomposed, give 33 kg. H, plus 267 kg. O.

The 3,376 cu. m. air contain 1,015 kg. O, plus 3,350 kg. N, or 709 cu. m. O, plus 2,267 cu. m. N.

The combustion of this gas would require oxygen, as follows:

55.5 cu. m. CH_4, double the volume O	=	111.0 cu. m. O.
1,560.9 cu. m. CO, half the volume O	=	780.4 cu. m. O.
256.6 cu. m. H, half the volume O	=	128.3 cu. m. O.
Total		1,019.7 cu. m. O,

Or 4,852 cu. m. air, resulting in the following gas:

256.6 cu. m. H, plus 128 cu. m. O, = 210 kg. H_2O.

55.5 cu. m. CH_4, plus 111.0 cu. m. O., = 55.5 cu. m. CO, plus 90 kg. H_2O.

1,560.9 cu. m. CO_2, plus 780.4 cu. m. O, = 1,560.9 cu. m. CO_2.

113.7 cu. m. CO_2 = 113.7 cu. m. CO_2.

2,667.2 cu. m. N in generator gas = 2,667.2 cu. m. N.

3,988.0 cu. m. N in air for combustion = 3,988 cu. m. N,

Or the condensed combustion gas contained by volume—

20.63 per cent. CO_2 plus 79.37 per cent. N.

The air required for complete combustion of 1,000 kg. coke is, therefore—

3,376 cu. m. primary air,	or 41 per cent.
plus 4,858 cu. m. secondary air,	or 59 per cent.
Total, 8,234 cu. m. air.	100 per cent.

The aforesaid gases would give, as products of combustion, therefore,

1,730.2 cu. m. CO_2,

6,665.0 cu. m. N,

plus 3,000 kg. steam.

To the aforesaid total amount of air required for complete combustion must be added the amount of air required for forming clinkers, equal to about 226 cubic meters; so that the total amount of air required would be about 8,500 cubic meters per 1,000 kg. of coke used for fuel.

The amount of heat carried away by CO_2 and N would be equal in all cases, providing the waste products left the recuperator at the same temperature; while the amount carried away by steam would be the following, if the gases left at 620° C.:

I.— 84 kg. × (620–20) × 0.4805 = 84 × 288 = 24,192 cal.

II.—614 kg. × (620–20) × 0.4805 = 614 × 288 = 177,984 cal.

III.—300 kg. × (620–20) × 0.4805 = 300 × 288 = 86,400 cal.

But in the two first cases the primary air was not superheated, and the evaporation of water was done by the radiation of the grate on the ashpan (water pan), thereby directly cooling the grate by water. The waste gases in cases I. and II. had a temperature of 620°, while in case III. the primary air was also superheated and the waste gases left at 360° C. The loss was, therefore, as follows:

I.— 24,192 cal.

II.—177,984 cal.

III.— 48,900 cal. = (360–20) × 0.4805 × 300.

If the steam had been used it would have required in addition 1 kg. coke for every 6 kg. steam used, or, in case of instance

II.—102 kg. coke additional, or 10.2 per cent.; or, in case of instance

III.— 50 kg. coke additional, or 5 per cent. of the total amount of coke fired.

This amount of fuel would of course have been used in the steam boiler.

The high per cent. of CH_4 and the low per cent. of CO_2 in case No. III. is explained by the superheating of primary air and mixing same with water vapor, and thereby superheating the water vapor also, and by firing hot coke.

Out of the aforesaid three sample cases it will be seen that the exact amount of primary or secondary air required can never be calculated; the only thing that can be said is, 1,000 kg. coke require about 8,500 cubic meters air. And if primary and secondary air are superheated in good recuperator and the waste gases leave furnace at about 360° C., the amount of primary air is about 42 per cent. and of secondary air 58 per cent. of total air used. To the theoretical amount of 8,500 cubic meters of air ought to be added from 3 to 8 per cent. for leakage, or, say, the total amount of air required is about 9,000 cubic meters for 1,000 kg. coke (containing about 93.0 per cent. C plus 0.3 per cent. S), or 3,780 cubic meters primary and 5,220 cubic meters secondary air; or, expressed in pounds and cubic feet, 6,055 cubic feet primary and 8,362 cubic feet secondary air are required for 1,000 pounds of coke.

Steam should never be used, as live steam costs fuel and exhaust steam cannot well be used with regularity.

To practically determine the amount of primary and secondary air required the best plan to follow is as follows: Heat up your bench by giving an excess of primary air till you obtain the necessary heat required. Then make an analysis of the waste gases, and if you find that there is any free CO present, add more air; if there is too much O decrease your air, so that the analysis will show from 18½ to 19½ per cent. CO_2 and from ½ to 2 per cent. O.

As most of you will not have time and apparatus to make this analysis, I will try to give you an idea how I regulate my secondary air when no apparatus is at hand. I fire up the bench till it has the required heat, then increase or decrease the secondary air till a blue flame appears in the lower part of the recuperator, showing that there is CO in the waste gases. Then increase the secondary air supply, little by little, about every two minutes, till the blue flame just disappears. I then know that I am working right. I generally find then that the temperature in the furnace rises and I decrease my draft and at the same time my primary air. Then, by cutting off the fuel consumption, it is scarcely necessary to touch the secondary air, as that can be regulated by adjusting the primary air and drafts, but if that should not be convenient the secondary air may be adjusted, too.

If I find that my recuperator is too hot, notwithstanding that the combustion is complete, it will show that too much water is evaporated. It will then generally be found that the bench itself is cold, the consumption of fuel enormous and the recuperation altogether too hot. The reason is the disassociation of the elements.

Theoretically, the flame temperature of H burned to water, and of CO burned to CO_2 is about 5,000° F., but at a temperature of 3,500° F. steam will be decomposed into O and 2H, and, therefore, above this temperature no combustion is possible. In other words, any great amount of H in combustible gases will limit the flame temperature to 3,500° F., while CO_2 will not be decomposed into CO and O till it reaches a temperature of 4,900° F.

You will thereby see that it is possible to obtain practically a higher temperature with CO than H. You all have seen and heard of explosions taking place in the oxygen-hydrogen blasts. They are nothing else than the reuniting of 2H plus O=H_2O which had previously disassociated.

A great drawback to adding and decomposing too much steam in the generator is a high percentage of H, requiring an enormous combustion chamber, which generally cannot be made in a retort furnace without interfering with the stability of the work.

If the combustion chamber is too small for the complete combustion of H, part of the combustion goes on in the recuperator and the heat is lost. If you add more steam or evaporate more water than the fuel in the generator can decompose, part of it will leave the generator in the form of superheated steam and will be decomposed when the temperature of combustion rises high enough, naturally absorbing heat, which will be regained, but not suddenly; generally only after the gases have travelled 3 or more feet, and, therefore, pretty nearly at the entrance of the recuperator, and all this heat is practically lost to the retorts and sent to the recuperator where it will not do much good.

It must always be remembered that it is not the quantity of the heat which is required for heating the retorts as much as high initial temperature; and, therefore, my advice is to use as little water as possible, just to prevent clinkers; evaporate your water by the waste gases and by cooling off your grate bars. See that the space where primary air and steam mix is sufficiently large, say 20 to 25 cubic feet, for benches of 9's, and about 15 to 18 cubic feet for benches of 6's. If you have less space the mixing is not thorough and the steam goes through one part of the fuel and the air through the other, a mistake very often made in the use of open and narrow generators. The great drawback to this kind of generator is that the combustion and supply of secondary air cannot be properly adjusted. The result is, in one part of the furnace there is too much O, and in the other part the combustion is correct, and in the third part there is too much CO and not enough O, thereby resulting in waste of fuel and uneven heating, and as there are no openings for CO, nothing can be regulated, and the furnace will go all right to-day and be bad to-morrow, changing very rapidly; or, in other words, it will be "cranky," not speaking of other inconveniences, such as deflecting too much heat from the combustion chamber back to the generator, and thereby rapidly destroying the brickwork of the generator.

To attempt to figure out the necessary amount of openings required for primary and secondary air would be almost a thing of impossibility, and not practical. I have heard it advocated to give a certain amount of secondary air per 100 pounds of coal carbonized, but this is not practical, as I have shown before. The best plan is, in my opinion, the one I have advocated.

Discussion.

Mr. Chollar—A paper like this it is simply impossible to discuss extemporaneously. It is a paper written by a man of great ability under disadvantages. If he could have written it in German and then have had it translated into English it would have been more intelligible to us. It is both a paper and a work of reference. It is possible that the idea of regenerative furnaces might be put in shorter terms. With the ordinary furnace we will say that 2,500° F. is the proper temperature anything less than that would cool the furnace. With the ordinary open fire the temperature of the outgoing exhaust gases would be probably 2,000°, while the highest temperature of the furnace might be 2,500°. Of all the air that goes up the chimney, 500° is enough to make a draft. All that we get in making gas, therefore, is the difference between 2,500° and 2,000°. Now, we have 2,000° going up the chimney—500° is enough to make a draft; the difference between the 500 and the 2,000 is 1,500, or three-fifths of the whole actual amount is what we must attempt to get back. The only way to get it back is to heat the air which comes into the furnace. This is the regenerative process. Now, the question of steam that the gentleman speaks about is this: There is an immense amount of heat possible to be gained back, if we can gain it. He says we ought not to use steam. The gentleman is entirely correct; we ought not to use steam because we have plenty of surplus heat to evaporate water with—the temperature for evaporation of water being below anything we want to generate at. When he speaks of using as little steam or vapor of water as possible he means this: That if we use an excess of steam, or more than can be utilized, it passes into the retort chamber undecomposed, and then, unutilized, into the recuperative flues, and where it will be lost; consequently we ought to use as little steam as possible—only enough to decompose the clinkers and yet lose none in the recuperative flues. The paper don't admit of intelligible discussion extemporaneously. It is "high flown"—"out of sight." I think, Mr. President, that there are some few slight mistakes—possibly misprints.

The Secretary—Mr. Bredel's right-hand man, Mr. Buss, is here, and perhaps has something of interest to say on this subject.

Mr. Buss—I think the paper just read was not intended so much for practical use as for a theoretical treatment of the subject. What I know as to the proportions of primary and secondary air, and the use of steam in this connection, relates only to the practical part. I have had experience in the practical part of the work; and in determining the primary and secondary air necessary I close the draft dampers as much as possible until I get a little bit of pressure, then open the damper a little bit more, and that would be about the right position for the draft damper. As to the proportions of primary and secondary air, I have found out in a practical way that, in a bench of 9's, the proper sized opening for primary air is about 8 square inches in the front wall where it enters. In a bench of 9's it is well understood that the proper proportion of secondary air to primary air is as 5 to 4; that is, if the primary air opening is 4 square inches, the secondary air opening should be 5 square inches. That is about a practical proportion. If you use too much steam the heat drops down very much, and you will find a deposit in the recuperators. I have found it of advantage to use as little steam as possible; not to use steam by leading the gas from the recuperators under the ashpan. It cools down too quickly. Some people say that they save a lot of fuel by using steam, but I have never found it so.

The President—Suppose I took a tube to determine the proper quantity of secondary air, and blew in air through it between the wall and lower retort; now, if the air that I blew in would burn, then, suppose I gave it secondary air until this air I blew in would not burn any more; would that determine the proportion?

Mr. Buss—Simply blow air into the combustion chamber?

The President—No, sir; between the wall of the arch and the lower retort.

Mr. Buss—Well, there is no combustion taking place there; but I have not made that test. If you see a blue flame in the recuperator, then you have too little secondary air. Now, if you open the secondaries more, you will see, in about two minutes, that the blue flame disappears, and then you have secondary air enough.

Mr. Printz—I do not know, Mr. President, that I can say anything on this paper. As Mr. Chollar says, it is too "high" for me. We have some benches which are supposed to be regenerative, but they really are not. They are full-depth furnaces, in the neighborhood of 5 feet 9 inches from the grate bar to the top of the fuel; but our primary air is not regulated. It merely enters the door in front of the ash pan. Our secondary air, of course, is heated, but not in proper amount; yet we get very good results. Benches of 6's, with our native coal, which yields probably 4.60, give us anywhere from 42,000 to 45,000 to the

bench. As to the amount of fuel consumed, I do not see any difference between these and the old style furnaces. The only advantage is that they can be very easily taken care of, and there are no clinkers. I have no doubt the members would think that I was telling something that was not so if I were to tell them about our clinkers. We have used our furnaces many a time as long as three months without clinkering them at all. For three months we will not see the grate bars, only as we can see them from underneath; and we have run them as long as six months. With the old style furnaces it was necessary for us to clinker every 12 hours, just as other people did, while with these furnaces we simply have a tool we call a "sword," and about 4 times in 12 hours the men shake up the bars a little bit. We use considerable steam, but we are not troubled with drowning the fire out in order to clean the furnaces.

Mr. Chollar—I think Mr. Buss hardly understood the question put to him by the President; but he answered it all the same. He gave a very good answer, too. The admission of too little air at the outlet of the combustion chamber would be just the condition that would produce the blue flame he speaks of at the outlet of the recuperator; so that any blue flame that would appear at the outlet of the recuperator could be stopped by the admission of air to the combustion chamber.

The President—In connection with this subject, "Question No. 3" may be discussed. It is: "About what is the highest temperature applied in regenerative benches? In benches with inclined retorts? In common benches? And which degree of heat is most favorable for producing marketable tar?"

Mr. Chollar—I would regard that more as a conundrum than as a practical question. I do not think it is of particular interest to gas men. The temperature of a regenerative bench as compared with the common one is more interesting with regard to the fuel consumed than to temperature. A proper temperature can be got with any bench. The advantage of a regenerative furnace is in the saving of fuel. The latter paragraph of the question, "And which degree of heat is most favorable for producing tar?" I should give up entirely. We are not in the tar business; tar is a residuum.

A vote of thanks was tendered to Mr. Bredel for his paper.

Communication from the Society of Gas Lighting in the Matter of Uniformity in Castings.

The Secretary read the following communication from the Society of Gas Lighting:

To the Ohio Gas Light Association—Gentlemen: Our Society of Gas Lighting, having resolved to bring about uniformity in bells, flanges and spigots of pipes, and special castings used about gas works, and in laying distributing mains, a committee was appointed to devise a plan which would accomplish this end.

This committee looked into the matter carefully, and after correspondence with various manufacturers and an examination of their patterns, we found no set of standard patterns in existence; every maker of pipes or of gas works apparatus has one or more of his own. To quote from the letter of a prominent firm: "We have no patterns which might be called standard. During many years we have gone on filling the requirements of many engineers, and the result of working for so many masters is an accumulation of patterns of all kinds, as to size, weight and shape, etc." Many patterns are used indiscriminately both for gas and water works purposes.

After due consideration of the subject our committee got up a set of schedules, which are to govern the laying out of flanges, bells and spigots, and also the shapes and sizes and weights of special castings. The report of our committee containing these schedules has been finally accepted by the Society of Gas Lighting as their standard.

The majority of the manufacturers in this branch of business in our part of the country which we have been corresponding with, have indorsed our plan, and we doubt not that within a reasonable time (to allow for the change) our purpose will be accomplished. We now call upon our sister organizations to aid us in extending the good work. Very few gas companies deal with one foundry exclusively; hence it is of great importance to have all manufacturers follow the same rules and use standard patterns.

The scheme is of as much importance to you as it is to us; and, in the end, as beneficial to the foundryman as to the gas man.

We submit blue prints showing fully what is proposed, and would respectfully request you to take whatever action you deem best calculated to insure your valuable co-operation. Fraternally yours,

(Signed,) Alex. H. Strecker, Newark, E. Vanderpool, Newark, D. D. Flemming, Jersey City, A. B. Slater, Providence, } Committee on Special Castings of the Society of Gas Lighting.

By Alexander H. Strecker.

Appointment of a Conference Committee on Special Castings.

Mr. Humphreys—I move that the communication and the subject be referred to a special committee of 3 to take action thereon, and to see if proper co-operation can be brought about with the other Associations. I think this is an important subject and one that demands earnest consideration. We all have experienced the inconvenience referred to.

The motion, being seconded, was carried, and the President appointed upon that committee Messrs. Butterworth, Printz, and Faben.

Report of Committee on Next Place of Meeting.

The President—Next in order is the report of the Committee on Place of Next Meeting.

Mr. Welch—An invitation has been extended to the Association by the officers of the Columbus Gas Light and Coke Company to make Columbus a permanent place of meeting. We have, as a committee, concluded to accept this invitation, so far as the next meeting is concerned, and we wish to make that as our report.

The President—Gentlemen, you have heard the report, what is your pleasure?

Mr. Graeff—Will that interfere with the possibility of this Association meeting at Chicago, as suggested by Mr. Humphreys?

The President—I think that possibly can be taken care of by calling a special meeting.

Mr. Graeff—Would the Executive Committee have power, in case it would be found generally desirable for the Association to meet in the Gas Industry Building, at Chicago, to order a change of place of meeting?

A Member—I would like to inquire what is the date of the opening of the World's Fair?

Mr. Humphreys—I think it is in May, sir.

The Secretary—That of course would be after the time fixed in the Constitution for our next meeting; but at the same time, if, at our next meeting, it should develop that the Association would like to meet again during the summer or fall, at the Gas Industry Building in Chicago, we could then arrange for a special meeting at that time and place. (On motion the report of the Committee was adopted.)

Mr. Padan—If we find it advisable to meet at that time and place, instead of in March, at Columbus, we can have it so understood beforehand, and then a few of us could meet here at the appointed time, and adjourn to such time and place as would be advisable and practicable.

Election of Officers Postponed.

Mr. Printz then submitted the following report from the Committee on Nominations: For President, Mr. W. W. Cantine, of Alliance; for Vice-President, Mr. George H. Tayler, of Warren; for Secretary and Treasurer, Mr. Irvin Butterworth, of Columbus; for Executive Committee (to serve for 1 year), Messrs. G. N. Clapp, Middletown, and R. A. Ditmar, Troy; for 2 years, Messrs. J. W. R. Cline, of Springfield, and G. A. Allen, of Zanesville. (Signed) Eugene Printz, George Matt, Jerome Penn, Committee.

On motion of Mr. Graeff, Mr. Gwynn was appointed a committee to cast the ballot of the Association for the gentlemen nominated.

Mr. McCook—Mr. Cantine told me that he was going away at 4 o'clock, and he very earnestly requested that he should not be put in nomination for any office; for, as he would not serve if nominated and elected, he didn't want the Association to go through the form of nominating and electing him to any office which he would not fill. You will remember, Mr. President, that last year at Zanesville he declined flatly to be a candidate when you were begging so hard for our votes as against him (laughter.)

Mr. Penn—That matter came up before us as a committee, and our recollection was that he gave way to our friend, Mr. Wilkiemeyer, at that time.

The President—That is my recollection; my recollection is that he got out of my way (laughter.)

Mr. McCook—He told me to day he didn't want the office, and wouldn't have it under any consideration.

The Secretary—That is what he told me.

Mr. McCook—Mr. Cantine told me to say to the convention that under no consideration would he accept the nomination for the Presidency of the Association.

The President—Then Mr. Gwynn can cast the ballot of the Association for the remaining nominees, and the committee can report later on as to the nominee for President.

Mr. McCook—I would remark that in making one man Secretary and Treasurer, you are giving Mr. Butterworth a good deal to do. You don't give him any more for it, and I don't see why the offices should be consolidated. I think it is a pretty good idea to change treasurer

every year, and not to let one man handle the funds too long. If he handles the funds 1 year he naturally wants it another year. I am able to speak from experience; for as you know I have been Treasurer of the Association, and found the funds very handy. I have paid up, however, and therefore, have no personal interest in the matter.

A Member—It would be less complicated, as I understand it, if the offices were combined. There would be less formality and red tape.

Mr. McCook—I suggest that we pass it around and let all the boys have a whack at it. I had the money for a year, and I tell you it is lots of fun, and, therefore, make that suggestion. If there is any special reason why the two offices should be consolidated at this time, then, of course, I will make no objection.

Mr. Shelton—I must take an opposite ground to our friend who spoke last. I am in favor of the consolidation under our new constitution. I am somewhat familiar with the class of work which the Secretary and Treasurer is expected to do, acting as I do in that capacity for The Gas Club of Chicago. We have quite a large delegation here from The Gas Club—seven or eight of the members are present—and as an organization we extend to you all the good wishes which one gas man can extend to another. We don't pretend to be an Association in the strict sense of the word, but we are a Gas Club as implied by the more "elastic" sense of the word. We are elastic in our informality, and yet we attend to the business before us. We try to make it a live, energetic and prosperous organization, and we hope to extend to you a hospitable welcome at the convention held during the World's Fair. We have back bone when it is necessary, notwithstanding the elastic informality of our meetings and discussions, and we hope to show that back bone in the work we expect to do in the World's Fair matter. (Applause.) But that is outside. In connection with the work of Secretary and Treasurer, I find it is a great convenience, and saves a great deal of red tape and time and labor, to have the offices held by one person. It saves correspondence, it saves time, it saves labor. The Treasurership is an empty honor, with all due respect to the noble gentlemen who have held it heretofore; and I am in favor of continuing it in the future in combination with the Secretaryship.

The Secretary—I am afraid that the action of this committee was brought about by an incidental remark which I made, to the effect that I personally believed that the labors of the Secretary would be decreased if he had charge of the Treasurer's books as well as the Secretary's. It would undoubtedly save red tape and work, but any preferences I have ought to be a very slight consideration, and I certainly waive them in this matter.

Mr. Humphreys—I move that the report of the Committee on Nominations be laid on the table to give the committee a chance to nominate a President, and then this other matter may be brought up when their report is made. (Seconded and carried.)

Welcoming The Gas Club Delegates.

On motion of Mr. Graeff, a hearty welcome was extended to the representatives of The Gas Club of Chicago, present. After the motion was seconded and carried the President said: Gentlemen, we extend to you on behalf of the Ohio Gas Light Association, a hearty welcome. We have met most of you, but for fear that possibly some of you might have been overlooked, will ask all the members of The Gas Club of Chicago present in the room to rise to their feet in order that we may look them in their faces. (Applause.)

Opening the Question-Box.

We will now take up the Question-Box. Question No. I. is: "Is a gas engine satisfactory for furnishing power for a small electric light plant?"

Mr. McCook—I suggest that the President answer that question.

The President—The experience I have had in that regard was quite satisfactory. I had considerable trouble at first, but it was neither the fault of the plant nor of the engine. It was simply because I was ignorant of the entire business; but by remaining with it and mastering it I had no difficulty.

Mr. Ramsdell—I have just had occasion to investigate this subject. We have an electric light plant in which we expect this spring to increase our power and I visited 1 or 2 plants where gas was the motor power used, and was so well pleased with the operation and the economy that I have concluded to put in a gas engine for that same purpose. If the city take the number of arc lights which they now propose to do, I shall put in a 100 horse power engine.

Mr. McCook—Is it policy to put in a gas engine that large?

Mr. Ramsdell—If the city take the number of lights they now think they will, we will have to put in one as large as that.

Mr. Hurlburt—Would you put in one 100-horse power engine, or two 50-horse power engines?

Mr. Ramsdell—Well, the conditions I am working under are a little bit peculiar. The 100-horse power engine is just the same size, so far as floor space is concerned, as the 50-horse power engine. It is practically two 50-horse power engines, 1 cylinder being above the other. The place I have in which to put this engine is only sufficient for one, and I could not get in two if I wanted to. I may say that the works at Racine, Wisconsin, which are near where our works are, are using two 50-horse power engines, and recommend that course; but I really fail to see any practical wisdom in using two 50's. If one of them gives out, the other is not large enough to operate the plant; and under the circumstances in which I am situated it is out of the question. We have no room to put them in. We have a steam plant now in operation, and expect to use both engines up to 9 o'clock or when the 9 o'clock circuit goes off, and we expect to have enough power from the gas engine to operate the plant the rest of the night, until we extinguish at 3 o'clock in the morning. Our contract is by moon, I believe.

Mr. Humphreys—I understand that Mr. Nettleton, of Birmingham, Connecticut, is using a gas engine, and I believe he has 100-horse power, but I rather think it is divided up. Quite recently I received word from a friend of mine in Germany, Herr Oechelhaueser, who was Director-General of the electric lighting companies for a district in Germany, stating that they had recently installed gas engines with as high capacity as 100-horse power with eminent success. The details I cannot give because they are contained in a very large handsome volume all in German, which I as yet have not had an opportunity to translate, but he is a gentleman who I know would not hesitate to answer any question which any gas man in America would ask him on this subject in which he is interested.

Mr. Penn—I am contemplating putting in a new incandescent plant, and want to run it with a gas engine. I don't want to put in a very large one, because I make good gas and I want the people to use gas; but we have been contemplating the use of a gas engine. Yesterday I called on W. A. Gill in this city, and found that they were running an electric light plant and other machinery with a 35-horse power Otto engine. The point I want to get at is whether a gas engine would give steady enough power to keep the lights regular and prevent them from waving and fluctuating. He says they don't bother them in their business, but I know if we had customers that had that kind of a light they would be kicking all the time. If that can be prevented I do not see why gas engines are not just the thing, especially for people situated as we are. I think, if the conditions are as I expect them to be, we could run a gas engine as cheap as I could get the coal. That is my calculation. Of course, I have figured it all out on paper, but I think I can do this in practice. Some say that in order to secure a steady light you must put a balance wheel on the counter-shaft, which will overcome that unsteady motion. Another gentleman and myself were down at Hamilton, Ohio, some time ago, and there saw flywheels supplied in this way. They didn't have any incandescent lights operating while we were there, but they expected to use them. If anyone here has had any experience in incandescent lights, operated by gas engines, I would like to hear from him. I do not think there would be any difficulty in running an arc light plant with a gas engine, because fluctuation there don't matter.

The President—The experience I had was in operating 800 candle power lamps—I had to have very steady power to give satisfaction—and the satisfaction we gave was certainly everything any one could desire. Everybody was pleased with it. While I was in charge of that plant several gentlemen in control of and managing very large electric light plants came and examined it, and when they saw the 800 candle power lamp and the light furnished, they could scarcely believe that it was so small, for the light was so good, so perfectly steady; there was no fluttering or fluctuation about it. The system possibly might have had something to do with it, but the light was certainly steady, and the fluctuation and the fluttering were overcome by putting quite a heavy balance wheel on the countershaft. Of course, that is an expensive arrangement. But with gas engines as now made, there is no trouble. Like every other piece of machinery, the gas engine must be studied before we can operate it properly. But there is no trouble with sliding valves on the new engines as they are now constructed—I am speaking of the Otto engine—there is nothing to get out of order. All you have to do is to clean the valve occasionally, probably once in six weeks or two months, and possibly grind it down. It is all done very easily and causes no trouble.

Col. Dell—In answer to Mr. Penn's inquiry, I will state that I was up in Racine about a year ago and fully discussed this matter of the gas engines with Mr. Rogers. Now as I am one of the apostles going over the country scattering facts to the truthful, I may say he told me he had

no trouble whatever in running his lights as steadily and as satisfactorily with gas engines as with steam engines—he has both incandescent and arc—and I think he put the cost at about 20 per cent. of that required to run with steam power. He has his figures down very complete.

Mr. Shelton—I think you could get information on this point by corresponding with a number of electric light plants in the East. If you will write to the manager of the electric light plant in Woonsocket, R. I., he will give you some information which may be of advantage to you. They are operating two or three 50-horse power gas engines. And I think the electric light plants at Danbury, Conn., and at Rockville, same State, are also operating two or three 50-horse power gas engines, each. At Rockville, Conn., they have had two 50 horse power gas engines, and they since have added a 100-horse power.

Mr. Ramsdell—I think the point is simply one of speed. As Mr. Penn remarks, in an arc light system it makes no difference—it is not perceptible; but they overcome the difficulty in the incandescent system by increasing the speed of the shaft and by placing a fly-wheel on the shaft besides. The two together make the running perfectly regular, so that there is no fluctuation.

The President—We have a gentleman here who has operated gas engines for years, and who employs 400 to 500 people. Now, if the gas engine were not a success with him he could not afford to keep it; and he is every year increasing the capacity of his plant. I refer to Mr. Padan of Portsmouth, who is constantly putting in gas engines. You will find them sitting side by side, a new one being added every year. These engines are not running an electric plant, but they are used in a branch of business in which it is just as necessary to have steady power as in an electric light plant.

Mr. Padan—We have used a number of gas engines for ten years or more in the shoe manufacturing business. When the Gas Company concluded to put in an arc light plant we paid a visit to the Raleigh (N. C.) Gas Company, who were using two gas engines of the Otto make. We were favorably impressed. The President of the Company told us, in his judgment there was a saving of 20 per cent. in the engine over the steam that he had taken out. With our gas engine less repair is necessary, and I believe all we have done in the year and a half that we have operated this machine is to grind the valve occasionally, and it is not likely to need repairs for the next five or ten years. We make the operation of the engine steady, in the way Mr. Ramsdell spoke of, by putting a 4,000 pound solid pulley on the shafting. It gives us a very good, steady light and there is no trouble with it; not any more trouble than to operate a steam engine.

Mr. Cline—I would like to inquire whether anyone has had any experience in running an exhauster with a gas engine. (No response.)

The President—If there is no response, we will go to the next question, No. 2, which is: "With an output of 10 million feet per annum, is it cheaper to run a steam jet exhauster than a rotary?"

Mr. Salter—As far as my experience goes in the use of a steam jet exhauster, I do not think any works is so small in which it would not pay to put in a steam jet exhauster. The cost of operating is comparatively slight—all you want is a small boiler, and the waste fuel you throw over your bank would be sufficient to operate any exhauster you would require. It does not require any intelligent labor—an ordinary stoker can run it. It is automatic in its action. It think would pay any small works to put in a steam jet exhauster.

The Secretary—The question is rather on a different line, I think, than your answer. The question is, "With an output of 10 million feet per annum, is it *cheaper* to run a steam jet exhauster than a rotary?"

Mr. Salter—I didn't understand the question; yes, it would be cheaper to run a steam jet exhauster for 10 million feet a year. They don't require the oil, never get out of repair and are no trouble comparatively. There is nothing about a steam jet exhauster to get out of repair.

The Secretary—What about its efficiency and satisfactoriness in every respect?

Mr. Salter—It is more efficient than a rotary; that has been my experience with it.

A Member—Has Mr. Salter ever used a rotary?

Mr. Salter—Yes, sir; I have.

Mr. Hurlburt—With reference to the steam jet exhauster, I will say that we have employed one, and we are now contemplating putting in a rotary in its stead to avoid naphthaline.

Mr. Marden—At Xenia I put in a rotary, and at Coshocton we have a steam jet exhauster, and we have no trouble whatever.

The President—Question 4 is, "Has there been a successful and economical fuel gas produced for general distribution?

Mr. McMillin—How much time have you got here? (Laughter.)

The President then called on Mr. Humphreys to answer the question?

Mr. Humphreys—I won't apolgize this time for getting to my feet, because I am called upon. In reply to that question I would say that if you could appoint a special meeting and set aside perhaps a whole week, a man could then place before you the subject in such a light that he could satisfactorily answer the question; but to attempt to answer such a question as is put here, with the time at our disposal, would be sure to put a man in a false light. There has been more humbuggery written about fuel gas, probably, than on any other one subject in our business. I don't think it would be any advantage to this Association to enter into a discussion of this question in the time you have before you. Just to give you an idea, you have got to state at the outset what the gas is to be used for.

The Secretary—The question says "For general distribution."

Mr. Humphreys—Yes; and that opens the question right off whether, by "general distribution," you mean for boiler purposes or manufacturing purposes; and you have opened up the whole field by that inquiry. The matter has got to be gone into satisfactorily, or not at all. You have to supply different gases for different purposes. If the boiler comes into the question, you have at once an immense question which it will take time to thoroughly dispose of. The boiler itself, if well run, is the most economical gas machine. It is too big a question to answer in that way.

The President—Question No. 5 is, "What does the Association know about the so-called 'sanitary gas?'"

Mr. Shelton—Which kind of sanitary gas is referred to? There are two kinds of sanitary gas. I have heard of one kind of sanitary gas which is manufactured at New Bedford, Mass., that was made out of ground corncobs, while to make a perfect gas, according to its manufacturer, potato juice is necessary. The fact was definitely stated before the Massachusetts Gas Commission, and it is on record in its proceedings. They stated that the sanitary gas is perfectly harmless; non-explosive; that you could inhale it, and have lots of fun with it. (Laughter.)

The President then called on Mr. McCall.

Mr. McCall—I know nothing of sanitary gas, only from the circular that was sent me.

The President—Question No. 6 is, "What are the functions of the ordinary wet scrubbers in a properly designed water gas plant? Is their use profitable?" I will call on Mr. Shelton.

Mr. Shelton—I suppose you have called on me in order to give Mr. Humphreys a rest. (Laughter.) The functions of the scrubbers in a water gas plant are primarily to take out what should not be made when putting in oil to give illuminating qualities to the gas. If the machine is poor, or if it is operated poorly, you are liable to make a gas with more or less lampblack. In order to remove these impurities the ordinary scrubber is put in. In the modern plant very little lampblack is met with, and for its removal I think the scrubber could be almost wholly discarded. In one sense it might be considered desirable—the air goes through it and cools the gas. There is no chemical reaction such as takes place in the manufacture of coal gas.

The President—Question No. 21 may also be considered at the same time, "What is the proper relative position of the condenser and scrubber in a water gas plant with a relief holder?"

Mr. Shelton—I do not think the relief holder cuts any figure as to its location in a water gas plant, as ordinarily constructed. In a water gas plant as ordinarily installed, first comes the generator, then the superheater, then the apparatus for mixing the ingredients that go to make up the gas—or, in other words, the apparatus that makes the gas; then comes the apparatus for purifying the gas. In a modern plant the scrubber comes first and the condenser afterwards, for the reason, to my mind, that you have to remove the tar or lampblack, or other impurities, from the gas. I think that can better be done hot, before attempting to cool the gas; and the function of the condenser, I think, requires that it should come after the gas goes through the hot scrubber. In the early plants the condensers were put in first. The National Company did that for a long time, but as a rule has changed from that course, and now puts in the scrubber first and condenser afterwards; and, for the reason I have stated, the United Gas Improvement Company invariably, I think, puts the scrubber first. I think that may be accepted as the modern principle. Remove all the heavy impurities possible, and then put in the condenser to cool the gas.

The President—Question No. 7 is, "In making water gas, what effect, if any, will long and short runs have on the uniformity of candle power?"

Mr. Thompson—Mr. Humphreys has not answered a question for about three minutes, and I would like him to answer this one. I would say in the plant with which I am connected we don't make our oil gas by steam; we make it by the retort system.

The President—We will have to call on you, Mr. Humphreys.

Mr. Humphreys—I ought to apologize to the Association for being on the floor so often; but since you have so kindly invited me to say a few words on this subject, I will do so. When I first entered the water gas business, at the works that were placed under my control they were making runs of about 30 minutes, and it seemed to be a regular practice. The man who had control of the works seemed to require, as a part of the water gas plant, a hot poker; and a man up on the deck would call out, "Billy, are you ready?" and Billy would say, "Yes;" then he would open the stopcock and shove the hot poker in. In other words, it became a regular thing with him to just so often fire the gas in the superheater; the result was they had to put a run on sometimes five minutes before they could fire the gas in the superheater. It don't take any argument to show that that was a ruinous practice. Suppose we had a scale representing temperatures that high (indicating), and that, say, between points A and B there was no more variation in temperature than would correct the variation in the material used; in other words, temperature A might be all right for A′ part of the mixture; temperature B might be all right for B′ part of the mixture, and all the way in between, representing the different temperatures that would suit the different portions of oil, which of course is a mixture; therefore, we can assume, if the temperature between A and B will give you a practically uniform heat, it is just as uniform for the treatment of that oil as if you had it absolutely at the center. In the place of that, suppose you have temperature B and temperature D, after you pass A going up, you have got past the economical point and you are going to make lampblack; after you get past B on the long run, you are going to make tar. That is the theory. The same men that were making large quantities of lampblack were making large quantities of tar. At another works I visited, as a part of the water gas manufacture, a man was stationed at the side of the scrubber to remove the lampblack, and you could see, by the regular "swing" which he had, that he knew just how often to move to keep the lampblack off of the tar. That is no exaggeration. It is an absolute fact. It does not take any argument to show that that was not a perfectly working water gas plant. With a properly equipped and properly managed water gas plant, uniform results can be obtained. Now, the question is, "In making water gas, what effect, if any, will long or short runs have on the uniformity of the candle power?" It goes without saying that if you are going to get uniform results in your superheater and a uniform candle power, you must not handle your heats in this way, for you are getting different results for every second of time you have to run; and the way to get an even result in your gas making is by making short runs, and so have practically uniform temperatures.

The President—Question No. 10 is, "Is it usual in Ohio for plumbers or gas fitters to run the service pipes for gas supply from curbstone to meter?"

Mr. Cline—You mean gas fitters, outside of gas companies?

The President—I think so; yes, sir.

Mr. Cline—I don't know what the custom is throughout the State, but in our neighborhood it is not customary, for we run the service pipe to the meter.

The President—Why don't they do it, Mr. Cline?

Mr. Cline—Because they have no knowledge of how a service pipe should be run. They have no idea of a "trap" or anything of that kind, and they would probably leave the service pipe in a leaking condition.

The Secretary—Why don't you go ahead and do the house fitting for the same reason?

Mr. Cline—Well, we can always superintend it and see that the pipe, after it is put into the building, is in proper condition.

The Secretary—Couldn't you inspect the service pipe in the same way?

Mr. Cline—They generally get it covered up before you get there.

Mr. Padan—I would like to ask if the plumbers did do the work, what would you do about it?

Mr. Cline—We would not connect.

Mr. Padan—Couldn't the consumer legally make you do so; couldn't he force you to supply the gas under the laws of Ohio?

Mr. Welch—I didn't get the drift of that question.

The Secretary—The question is, "Couldn't the gas companies, under the laws of Ohio, be compelled to send gas through the service pipe although it was laid by the plumber, notwithstanding the gas company claimed the right to do that work itself?"

Mr. Welch—I do not know whether they could be or not, but I should say the proper way would be to inspect the service pipe before it is covered up. It would not make any difference who put it in, if it were done right.

The President—Question No. 11 is, "What remedy is applied in Ohio where a consumer who would use only from 300 to 800 feet of gas per annum demands a meter?"

Mr. McMillin—Use an axe (laughter).

The Secretary—I would say, charge a liberal meter rent.

Mr. Welch—Suppose you cannot charge a meter rent? I do not understand that there is a law against charging meter rents, but I have a custom of charging 25 cents for gas whether the consumer uses it or not. I am not charging him for the meter, but I am charging him for the gas; whether he gets it or not, I put in a bill for 100 feet.

Mr. Evers—We have been following the same custom that Mr. Welch refers to. If they don't consume a certain amount of gas, we charge them so much any way, and they all understand it.

The President—Question No. 12 is, "In using iron oxide on 3 screens, when the box was changed top layer was found clean, while others were very foul. The same thing occurred with material reversed; and also about 6 inches of top was clean when only 1 screen was used. There were no blow holes. What was the cause?"

Mr. Chollar—Does the gas enter the purifier at the bottom or top?

The President—At the bottom.

Mr. Salter—I have had some experience similar to that indicated in the question. I found at times that the oxide in shrinking away from the side of the box would leave a space there, so I directed my men to press the oxide down tightly along the sides of the boxes. That overcame the difficulty to some extent.

Mr. Humphreys—Do I understand the question to mean that when the oxide is taken out it is actually found to be foul, or that it shows a foul test?

The Secretary—The oxide itself on the two lower screens was foul.

Mr. Douglas—As I handed in that question, I may perhaps be able to explain it a little more fully. In using iron oxide on 3 screens for 3 or 4 times, on opening the box the top layer was found to be entirely clean, while the remainder of the box was very black and foul. After the material was revivified it was put back, putting that which was on the top layer, at the bottom, and the same thing occurred again, the top layer being clean. The same thing occurred when it was all put in 1 layer, about 24 inches deep. About 6 inches of the top showed quite clean, while the remainder was foul.

Mr. Chollar—It is very easy to imagine a certain condition of affairs that would cause that. A large admission of air through the exhauster would be very likely to produce that very result. But the question does not give data enough to enable one to make an intelligent answer.

Mr. Douglas—My candle power was all right, and I was running heavy at the time—it was during the winter, when we made the most gas. Noticing it, I reversed the material after it was revivified, being careful to see it was not the fault of that particular oxide.

The Secretary—How often did the phenomenon manifest itself?

Mr. Douglas—Three or four times.

The Secretary—Did it occur in the same box each time?

Mr. Douglas—No, sir; in every box. I thought probably it was due to some blow-holes in the top layer, but I was unable to find any.

The President—Question No. 14 is, "Should a small coal gas plant in Ohio be renewed for coal or some other system?" I will call on Mr. Shelton to answer that question.

Mr. Shelton—I like to have the office seek the man, at any rate. I should not have volunteered to answer that question, because, as Mr. Humphreys says, it is rather "trady;" yet, as you have asked for it, "by gracious," you shall have my answer. I think, in view of the conditions of gas manufacture, that it is inexpedient to renew on the old system; and the reasons for my belief are these. Ohio, as Mr. Humphreys has pointed out, has heretofore been backward in adopting water gas. Sundry local conditions, such as cheap coal, etc., have naturally tended to that end. In other parts of the country the progress has been much faster. We know that water gas is undoubtedly the modern way of manufacturing gas; we know it makes a better gas. I think there is no contention on that point at the present day. The retention

of coal gas in Ohio is purely on economical grounds. In an established works, of course, it is a very debatable question as to changing. I am not one of those who argue that water gas is the only salvation for a gas man, and that the water gas plant is the gas man's heaven. It is a question of locality; a question of cost. But when a coal gas works is worn out and the time comes for renewing it, then this very question of cost comes right home to you. If water gas costs no more to manufacture than coal gas, then there is every reason why you should put it in and enlarge on those lines. If water gas costs more than coal gas in its manufacture, even then there is a valid reason for adopting it, because of its superior quality and greater adaptability. In most places it is cheaper. In the majority of places in this State I think it is fully as cheap as coal gas, especially in small works. In making coal gas you have to run your works with two shifts. You cannot lock up your works and go home at night as in the case of water gas works. With a water gas plant you can make your gas in a few hours and be done with it. Your labor account in a small town is a very large factor of expense, and you want to utilize every means of economy to reduce your payroll. In a water gas plant your men will have the day's work well under way by noon, and then they will have the bulk of the afternoon to go uptown to set a meter, or to paint the gas house, or to do a great many other things which you have to hire other men to do when your men have to stick to the gas house, as in the case of a coal gas plant. When you take into consideration that a water gas plant does not cost a great deal, if any, more than a coal gas plant, even for a small works; when you take into consideration the question of capacity and the fact which we all know that it makes a higher candle power gas; that it is more cleanly, quicker made, more convenient, better adapted for the purpose of its manufacture, and, above all, does not cost any more to make; on the whole, I do not think, if you are going to be progressive and keep abreast with the times, that you could do otherwise than to enlarge or remodel on the modern line of a water gas plant.

Col. Dell being called on by the Chair, said: Excuse me, Mr. Chairman, I do not care to discuss my business here at this meeting; I prefer to discuss it privately with my friends.

Mr. Penn—I would like to inquire if there can be a uniform candle power gas made by the water gas process? Is there not danger of having what I would call a "streak of fat" and a "streak of lean" in it?

Mr. Shelton—That would have applied ten years ago, but it does not apply now. If you have a gas maker that makes water gas so that it is like a piece of bacon—a streak of fat and a streak of lean—I would bar him. There is no earthly necessity for it in a modern, well-equipped water gas plant. Of course, any man can mismanage a machine and make poor gas; but in a modern plant making short runs—running every eight or ten minutes, intead of every half hour, and going off and eating breakfast in the meantime—by exercising ordinary care you can make absolutely uniform gas.

The President—Question No. 15 is: "Who, if any, in this State is using a 'cartridge' to enrich coal gas? How made and used, size of pipe; manner of flilling; what filled with; when used, etc.?"

Mr. Wells—I have been using a "cartridge" to enrich gas for about six or seven months with very good results indeed. I take a 1½ inch pipe, about three feet in length, and fill it up with crude oil. When I put the coal in the retort I simply throw that cartridge in and put the lid on, and I am enriching my gas at low cost and with good results.

The President—Question No. 16 is, "What is the proper method of making cement joints in street mains? And what are the proper proportions of cement and sand?"

Mr. Gwynn—In my experience in making cement joints I never used any sand whatever. I use clear Portland cement. Having had occasion to dig them out afterwards I found them in very good condition—solid and substantial. On one line in particular, where we ran through quicksand, and where the joints are cemented as I have indicated, the drip does not fill once in a year—an ordinary sized drip box. The only trouble is if you wish to re-lay it you have to take a sledge to get it apart.

A Member—Do you use yarn?

Mr. Gwynn—About one-third yarn; in other words, on a 3-inch pipe we use probably an inch of yarn and the balance clear Portland cement. We use a layer of yarn, first, and caulk it in about an inch; then we put Portland cement and yarn on top of that, and then plaster it with clear Portland cement.

The President—Question 17: "What is the best and cheapest method of enriching coal gas with crude oil?"

Mr. Chollar—I do not know that I can tell you the best way, but I can tell you how we do it, and then you can judge for yourselves. In St. Louis we run a ¾-inch pipe to the back end of the retort, elevating the back end of the pipe a little higher than the front, so as to keep the pipe full of oil, and let the flow of oil run right into the back end of the retort. The rear end of the retort acts as a still or evaporating chamber, and the oil is converted into gas on its way to the stand-pipe. In order to keep the gas about right, we test with a piece of paper to see whether it shows any lampblack or tar. We regulate the flow of oil to suit the heat, so that if the little jet of gas strikes on white paper it will make a little spot about the color of a cigar leaf. If it is black it shows either that the heat is too high, or that there is too little oil; if it makes a tan-colored spot, the heat is too light, or too much oil; if it makes a nice brown or salmon color, then it is about right.

The President—Explain how you enter that pipe into the retort.

Mr. Chollar—For instance, this is the retort here (indicating); the pipe goes right through the lid, like that, and the supply pipe is here (indicating), and the cap here; so you can take the cap off whenever you want to to examine its condition.

A Member—How long does the pipe last?

Mr. Chollar—A year, more or less—the ¾-inch pipe running back to the back end of the retort. Instead of having any complicated apparatus, it is very simple in its construction. There is nothing put in the retort at all; it is empty, except as to that pipe.

Mr. Thompson—We make use of three systems. One is the same as that employed by Mr. Chollar; one which has been honored in having been used a considerable length of time, and one which we are just trying and expect to obtain from it results better than from either of the other two. The system we have had in use the greater length of time has been the use of the 2½ or 3-inch wrought iron pipe, which is laid with a slight inclination toward the back of the retort. The oil is fed through the mouthpiece in a similar manner to that employed by Mr. Chollar. A small pipe is then inserted within the other one, and the forward end of the large pipe is filled up with clay. The oil thus flows through it, and is pretty well decomposed on its way to the back of the retort. Another system which we have just put into use, but not used for a sufficient length of time to enable me to speak from experience in reference to it, is rather more complicated than the other. It consists of three pipes; first, a ¾-inch pipe, which runs from the front to the back of the retort, with the back end open, and there makes its exit into a 3-inch pipe, with a cap at the back end, which gives it a forward motion; that again making its exit into a 6-inch pipe, with the front end capped, which gives the oil a third traverse the length of the retort. The oil by that time has become gas, and enters the heated walls of the retort and is there "fixed." By that system we find we can liberate nearly double the quantity of gas that we were enabled to by either of the other systems. Further than that I cannot say, because our experience has been of short duration.

The President—Question No. 19: "What is the relative value of crude oil and 'distillate,' in candle power per gallon, where both have been tried in the same water gas apparatus?"

Mr. Persons—I could not answer the question because I have had no experience with crude oil. My experience has been entirely with distillate, and I could not answer the question properly.

Mr. Shelton—I have no figures here, Mr. President, that would be of value to the Association.

The President—Question No. 20: "What relative results have been attained in respect to coal and coke consumption and capacity of apparatus per hour, with crude oil and distillate?"

There was no response to this inquiry.

The President—Question No. 22: "Are not two scrubbers, one wet and one dry, preferable to and more effective than one multitubular condenser and one scrubber?"

Mr. Faux—I would say that they are, from the fact that I had one scrubber and one multitubular condenser, but on dispensing with the multitubular condenser and putting in another scrubber, I think I got better results afterwards with two scrubbers than with a multitubular condenser and one scrubber.

Mr. Shelton—I would like to ask Mr. Faux what he attributed that to.

Mr. Faux—I don't know, unless it was that after I put in the second scrubber I had a chance to repump my liquor, and to pump it back through the scrubber which I had put in the place of the multitubular condenser; and I know what the result was—all the naphthaline deposits disappeared and I had no trouble thereafter.

Mr. Shelton—This question applied to water gas, as I understood the gentleman who handed it in.

Mr. Faux—Then I cannot answer the question.

The President then read Question No. 23: "Should gas companies, as such, contribute toward the expenses of the World's Fair Gas Buildings and Exhibit?"

Mr. Graeff—I think this Association, by the passage of the resolution already adopted endorsing all that has been done by the Gas Industry Council, has most decidedly given an affirmative answer to this question; but if it would add any strength to the matter, I would move you, sir, that this Association unanimously answer that question, "Yes." (Seconded.)

Mr. McCook—Then we will all have to "whack up."

Mr. Thompson—I feel like begging the pardon of this Association for trespassing upon their time, because I have not the honor of membership in your organization, but apart from the question of contribution of gas companies to the World's Fair Exhibit, I might add a word or two which may prove of interest as touching our national and individual pride. In the exhibit of 1889, at Paris. the gas engineers erected a very magnificent and handsome building in one of the most prominent positions to be found anywhere on the exhibition grounds, where it was seen by all visitors, and it was a favorite rendezvous for all local and visiting gas men. It was in that building that the English engineers, when they went over to the Continent, met, not only their compeers from their own country, but from France and in fact from all over the world. In addition to that I would say there were a great many English engineers who expressed a great curiosity as to what the American engineers would do in the coming Columbian World's Exposition, then already talked about. Now, we have said a great deal in defense and in favor of our national institutions and we might be considered as being a little bombastic at times; but I don't think we can afford to let any opportunity escape in pushing forward this work which will reflect the highest credit upon ourselves, and in turn reflect credit on our country (applause.)

Mr. Graeff's motion was then carried.

The Secretary—There has been handed in another question: "Is there manufactured a lava tip, especially made for high candle power water gas; and, if not, how can its manufacture be brought about?"

Mr. Humphreys—I don't know of any such tip, and I don't see why there should be. I think from the burners already made, a proper burner could be selected for high candle power water gas.

The President then called for the report of the committee on nominations, and Mr. Printz submitted the following:

Supplemental Report of Committee on Nominations.

The Committee, in selecting another name for President, don't do so as a "second choice;" but I can say that the gentleman whom we have selected was considered equally with the other gentleman whom we have nominated before, and the only consideration that gave the other gentleman the preference was the fact that the last year he so very kindly withdrew in favor of the present incumbent. We nominate for President Mr. Charles H. Welch, of Athens; for Vice-President, Mr. George H. Tayler. When we came to nominate a person for Secretary and Treasurer we found that there was some feeling on the part of a number of members against consolidating the offices of Secretary and Treasurer. Some appear to feel as though there ought to be two, and before we nominate anyone we would like an expression of the members on this subject.

The Secretary—I think perhaps the Nominating Committee have been led to take the action they did in this matter by a remark I dropped. I feel very much embarrassed to have the matter brought up in this manner. It is presumptuous in me probably to expect a nomination for Secretary and Treasurer, but I ventured the remark, probably unbecomingly, that I thought the Secretary's duties would be a little less arduous if the two offices were held by one person. Under the circumstances, howeve., I should feel like very strongly favoring the proposition that there ought to be two persons nominated, one for each office.

Mr. Printz—When the Committee had the matter under consideration at first, we consulted with quite a number of members, and were under the impression that the almost unanimous sentiment was to have the offices held by one person; but we have learned since that there are quite a number who feel differently, and we have, therefore, asked for an expression of opinion.

Mr. Graeff—In order to get an expression of opinion from the members, I move, Mr. President, that the two offices be united in one. (Motion being seconded, was carried.)

Mr. Printz—That being the case, we nominate for Secretary and Treasurer, Mr. Irvin Butterworth, of Columbus, O., and for Executive Committee the nominees which were formally announced.

On motion of Mr. Graeff, Mr. Gwynn was instructed to cast the ballot of the Association for the election of the officers nominated, which he did.

Responses from the Officers-Elect.

The President—Gentlemen, I now take pleasure in introducing to you your newly-elected President, Mr. Charles H. Welch; and I hope, Mr. President, your path will be as nicely hewn out for you as mine has for me by our worthy Secretary, and that you will receive the same hearty co-operation from the membership that I have received during my incumbency.

Mr. Welch—I thank you, Mr. Chairman and gentlemen. I am very sorry that Mr. Cantine went home. (Laughter.) I should be wanting in all that goes to make up the pride which we all feel in being members of this Association did I not fully appreciate the honor that you have conferred upon me. I am mindful of the abilities possessed by those who have held this office in the past, and it is with considerable embarrassment that I would enter upon the discharge of its duties: but since you have been rash enough to elect me, I will expect your co-operation. I thank you very much. (Applause.)

Mr. Nash—I would like to ask Mr. Humphreys, because of this rather unsettled condition of the World's Fair matter, whether he expects an answer to his circular already sent out, or will he await an answer pending the results at Washington?

Mr. Humphreys—I think, in view of our recent set-back, and the fact that the present condition of affairs has been so widely promulgated, it would be just as well if things are put in good shape for our Council to send out a small notice saying that we are expecting subscriptions.

Votes of Thanks.

On motion of Mr. Welch, the thanks of the Association were tendered the Columbus Gas Light and Coke Company for the facilities provided by them for the meeting.

On motion of Mr. Shelton, a vote of thanks was given to the President and Secretary for their efforts in behalf of the success of the meeting, which they acknowledged, respectively, as follows:

The President—Gentlemen, I thank you very much for the assistance you have given me, and if this meeting has been a success, it is entirely due to the interest and zeal that you as individual members have manifested in its deliberations. We have had no trouble in getting a large attendance. We were close together, and there was nothing lacking to make this meeting a success; and it was you who did it. My only ambition was, since you had chosen me to preside at this meeting, that I would make it a profitable one. None of us have any money to throw away, and when we spend our money attending these meetings we expect to take home with us value in return. My only ambition has been to make this value as great as possible; and if I have succeeded, I will certainly look upon this meeting as a milestone in my life This has been an honor higher than I expected to reach or to have conferred upon me when I entered the gas business. I have worked hard, at least I thought I did. I have given it a great deal of attention at any rate, and the success which has attended this meeting is entirely owing to the assistance, as I said in my address, that I have received at the hands of this Association. I hope to meet you each year. I find that I cannot miss these meetings; I cannot afford to miss them; and I hope that everyone here present will feel just as I do. If you do, and will keep up your interest in the Ohio Gas Light Association, it will continue growing to surprise the people from the East and the West, who come here to see us and participate in our discussions (applause).

The Secretary—I asked President Wilkiemeyer to respond also for me in thanking you for the many courtesies I have received at your hands, but he don't seem to believe in vicarious responses. I want to express my gratitude to the Association for their vote of thanks, and to say that whatever of success has attended this meeting has been due to the co-operation of the members with me in securing papers and in making this a profitable meeting. I desire to thank you also for the renewal of your confidence in electing me Secretary of your Association for another year.

A motion to adjourn was then carried.

The new gas works at Taylorsville, Ill., notice of the incorporation of which was given by us some time ago, is to be fitted out for gas making under the Kendall oil process. It is said the works will be in operation on or before May 15.

Draw Shell Lime Kilns.

The *Scientific American*, in an illustrated article describing the kilns of Messrs. Murray & Byrne, of Jersey City, for the reduction of oyster and clam shells to lime, says:

The kilns are egg-shaped and made of brick, 3 to 4 feet in thickness, being lined inside with firebrick. The kilns are 25 feet in depth, 10 feet in diameter at the top, down to about 6 feet at the bottom. Each kiln when filled contains about 14 cart loads of shells. The kilns are first started with coke fires. A layer of shells is first placed on the coke, and then a layer of coal dust. This is repeated until the kilns are full. The coke fire at the bottom causes the first layer of shells to become red hot. This in turn sets fire to the layer of coal dust and up through the next layer of shells, the flames gradually creeping up through the different layers until they reach the top. The kilns are then drawn off. This is done by pulling out the iron bars or grate at the bottom or eye of kiln. As soon as the bars are drawn out the burnt shells drop down, if not obstructed by clinkers, and are carried away to be slaked. This is done by pouring a little water on to the burnt shells, which in a few moments turn into powdered lime. Large clinkers sometimes prevent the shells from lowering evenly. This is remedied by passing a long iron bar down along the sides from the top of the kiln. As soon as the burnt shells are lowered, bringing the fire to the eye of kiln, it is again filled up with layers of shells and coal dust, going over the same process as before. These fires are not allowed to go out, only in case of repair. It requires about 70 hours to burn one kiln of shells. This lime is used mostly in purifying gas. It is also used in soaps and for fertilizing purposes.

The draw kilns are a great improvement over the old way of letting out the fires every time they were drawn. The new shape allows the kilns to be drawn and refilled with the fires constantly burning. The shells are carted up to the top of kilns by means of an inclined roadway running along the side of the works. The shells are dumped on the platform and shoveled into the kilns. The cost of this plant is about $3,000.

The carts used are larger than the common cart, and hold about 35 bushels. Each kiln holds between 550 to 600 bushels of shells. A cart load of shells weighs about 2,240 lbs. Each full kiln will pan out about 630 bushels of slaked lime, or about 210 barrels. The shells come mostly from the markets of New York city. They are collected by carts. In some places they get their shells for nothing, and in others they pay a trifling sum yearly. The lime sells at 8 cents per bushel slaked, and 15 cents unslaked. The purchasers of this lime are gas companies, soap manufacturers and farmers. There are about seven firms in New York city and Brooklyn, and they turn out from 12,000 to 13,000 bushels daily, or about 4,000,000 to 5,000,000 bushels yearly. There is about 1 load of coal or coke dust to every 4 or 5 loads of shells. The coal or coke dust costs about $1 per load. Sometimes they get it for nothing. Three men can do all the work around three kilns. There is no particular distance between the layers of shells, sometimes about a foot and sometimes less.

Coke Breeze Concrete.

The London *Journal* notes that the discussion upon the subject of coke breeze concrete, which has recently run through the correspondence columns of the *Builder*, has left the reputation of this material unimpaired. One writer avers that he has used it for the last 24 years, principally on account of its lightness; and he pronounces it an invaluable material for landings, stairs, floors, balconies on cantilevers and other purposes too numerous to mention. He also says that he has known shingle concrete, gauged in precisely the same manner, to crack while breeze concrete has stood without the slightest indication of failure. The proportions recommended by this writer are six parts of breeze to one part of cement, with care not to use too much water, and to keep the concrete damp for a few days if exposed to the sun, but not otherwise. A thickness of 2½ in. is stated to be sufficient for landings, etc.; and the great secret is defined to lie in gently tapping the concrete with a broad-bottomed wood punner till the whole is brought up to a level surface. When thoroughly dry flooring-boards may be nailed directly upon the concrete. This correspondent also states that he has just completed a theatre, all the landings and stairs of which are of coke breeze concrete, which was completed only eight or nine days before the opening, yet stood perfectly under heavy loading. Mr. W. Simmons describes how he constructed some years ago, in London, about 60 floors of coke breeze concrete without joists, and with spans of 12 and 14 feet the narrow way of the rooms. The concrete was laid 7 inches thick, and had 2½-inch by ¼-inch flat iron bars on edge buried in it 18 inches apart an inch above the soffit; the ends being threaded on continuous iron rods built into the walls. Each floor was made as the walls reached the required level. A cement ceiling and floor surface afterwards increased the thickness to 9 inches. The roofs were similar, but asphalted on the top. The only fault was that the rooms were cold in winter, owing to the rapid conduction of heat through the concrete. Mr. Simmons remarks that, if he were repeating the construction, he should make the floors double, by putting a second skin of concrete 3 or 4 inches thick on rough boards, on bearers resting on the main slab. These boards would have to remain in, as they could not be taken out. It may be questioned whether this is not a superfluously heavy construction.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. Samuel J. Shea, who has been in charge of the plant of the Capital Gas and Electric Light Company, of Frankfort, Ky., for something over 12 years—in fact, since the gas works were sold by the city to the present owners—has resigned, the resignation becoming effective on Friday last. Mr. Shea was a competent, energetic and popular Manager, and we have no doubt that the Company will miss his services. Mr. Shea has formed a partnership with Mr. J. R. Tanner, under the firm name of Shea & Tanner, for the purpose of carrying on the business of general machinists in Frankfort, and their shops are located at 125 Lewis street, that city. Good luck to them.

The San Francisco (Cal.) Gas Light Company has awarded to Mr. Adam Weber, of this city, the contract for the erection of a stack of 20 benches of 6's, to be fired with the new recuperative Weber furnaces.

Mr. Adam Ehebold, of No. 321 West 25th street, this city, writing to the Journal, under date of the 9th inst., calls attention to an invention designed to prevent the leakage or loss of gas through the stuffing boxes of gas meters. He asserts that the packing now used in meters, from age and other adverse influences, often becomes so dry that much loss in leakage is traced to the changed conditions of the stuffing boxes. We hope in some future issue to give the details of the invention spoken of, which the inventor claims is sure to be favorably received.

Mr. Thomas H. Hintz, who for many years acceptably served the Malden (Mass.) Gas Light Company as Assistant Manager, has been elected to the vacancy caused by the death of Mr. John Andrew in the management of the Chelsea (Mass.) Gas Light Company.

The officers chosen to manage the affairs of the People's Gas Light and Coke Company of Chicago are as follows: Directors, C. K. G. Billings, F. S. Winston, E. C. Benedict, George O. Knapp, E. J. Jerzmanowski; President, C. K. G. Billings; Vice-President, George O. Knapp; Secretary, John S. Zimmerman; Treasurer, H. J. Jones; Assistant Secretary and Treasurer, William F. Stewart.

The consolidation of the Burlington (Vt.) Gas Light Company and the Citizens Eiectric Light and Power Company of the same city, mention of the agreement for which was formerly made in our columns, has been ratified and completed.

Mr. W. S. Letherbury, Secretary of the Board of Town Council for Middletown, Del., will receive bids for the public lighting of that place, until Wednesday evening. The contract is to be on the basis of 5 years.

The Council Committee on Lights, Richmond (Va.) Municipal Gas Works, has at last decreed that new gas mains shall be laid through Main street. We believe the present pipes are 4 inches in diameter and have been laid 32 years—"befo' the wah!" The new mains are to be 8 inches in diameter.

The stand taken by the San Francisco authorities in respect to a rigid enforcement of the gas fixture inspection ordinance, referred to from time to time in our columns, is being vigorously combated by the hotel keepers, who so far seem to have the better of the contest. A correspondent writing to us about this matter, under date of April 1st, incloses the following: "Some cases very interesting to that portion of the public who are consumers of gas were argued and submitted before Judge Joachimsen in Police Court No. III., on the last Wednesday in March. The managers of the Baldwin, Palace, Grand, California, Lick and Russ House hotels were arrested for failure to file with the Gas Inspector (Mr. Brown) quarterly reports of the condition of the gas

fixtures in their respective hotels, as required by the provisions of Order 2229. This order has been attacked by Attorney Henry E. Highton, the specially retained counsel for all the defendants, on various grounds. Among others, as violating both the Federal and State Constitutions, as an unlawful interference with the ownership and use of property, as partial and unreasonable, as devolving upon the Gas Inspector duties not within the terms of the statute under which he was appointed, as conferring upon gas fitters, whose qualifications were prescribed, a quasi-official position, and as discriminating between different citizens of the same municipality. Judge Joachimsen concurred with Attorney Highton's views, which were amply sustained by citations from numerous authorities, and took the whole matter under advisement."

THE Corporation of the town of Lachine, Quebec, have applied to the Legislature for the right to furnish electric light in the town, "and within a radius of 4 miles outside the limits of said town."

WE are indebted to "A. R. T." for the following synopsis of the last annual report of the Montreal Gas Company: "The Directors of the Montreal Gas Company have issued their report for the year ended Feb. 29, 1892. Two semi-annual dividends of 6 per cent. each have been declared, amounting together to $269,798. The erection of two tower scrubbers, a condenser, a new iron roof to retort house at Ottawa street station, additional coal sheds, boilers and lesser work have been satisfactorily completed. Seven and one-half miles of new street mains were laid during the year. The Compuny continues to have an improving business in the sale of gas for cooking and heating, which is becoming daily more popular with consumers; and the quality of the gas has been maintained considerably above the Government standards—the illuminating power averaging about 18 candles. The directors report the satisfactory operation of the Company, and a steady increase of its business. It has resolved on making a reduction of 10 cents on the contract price with the Corporation, making the net cost $1.30 per 1,000 cubic feet, the reduction to take effect on May 1 next. The continuation of this policy commends itself to the Directors, as long as it tends to increase the consumption of gas. This will render necessary a further extension of the works and plant during the coming season, contracts for which have been entered into. The city has opened up and carried throgh the Company's property the streets known as Hochelaga, St. Catherine, Ontario, and Forsyth, as well as expropriating a portion of the river front lot, for a ramp from the Harbor to Notre Dame street, for which the Company has been awarded the sum of $9,932. The following Directors retire by rotation and are eligible for re election: Messrs. Hugh McLennan, John Ostell, Alex. Urquhart and Hon. L. R. Masson. The receipts of the Company were $723,658, of which $556,858 was for gas rent. In connection with this item $7,266 was written off for bad debts. Street lamps brought in $13,674, of which $7,794 was required for lighting, expenses, etc. The value of coke produced was $124,401, and of tar $49,864. The principal items of expenditure were. Coals, $191,506; salaries, $26,384; wages, $64,462; purification, $29,863; wear and tear, $32,432; corporation taxes, $15,828; government taxes, $3,315; sundries, $21,000; interest, $8,738; reconstruction account, $10,000."

MESSRS. JACKSON and Slade, acting as attorneys for Samuel Peckham, of Fall River, Mass., announce that the suit brought by them against the Fall River Electric Light Company, for damages to their client, brought about by the negligence of the defendants, has been withdrawn. The Company paid over substantial damages. The Fall River Company illuminates the streets of the city by means of arc lights suspended over the road centers from mast arms. Mr. Peckham now does not believe in the safety or desirability of this method of suspension; for the reason that while crossing a street, and when directly under one of the lamps, the supporting tackle gave way and down came lamp and carbons and all upon his head and shoulders.

MESSRS. VAN HORNE and Sears mean business under the franchise recently granted them for the operation of a gas works at Provo City, Utah. A site has been purchased, and construction work will be begun in May. The Company's capitalization has been put at $100,000.

CAROLINE MALLANGE, of Millwaukee, Wis., has entered suit against the local gas company for $5,000, in which sum she claims her property has been damaged by the act of the company in locating a lamp post on property owned by her in the 12th Ward.

THERE is every likelihood that Mr. Clingman's bill before the Ohio Legislature, which provides for a fine of $500, or imprisonment for 6 months, or both, for tapping electric light or power wires without authority, will become a law.

A PETITION in insolvency has been filed against the Home Gas Machine Company, of 114 State street, Boston, Mass., at the instance of Mr. G. W. Hunt.

SUPERINTENDENT WATERS, of the Adams (Mass.) Gas Light Company, has recently installed several Wenham burners. Among those who have ordered them are the Post Office authorities and the Greylock Bank.

WRITING of post office authorities and the lighting of such places puts us in mind of the fact that the handsome, new Federal buildings in Brooklyn, N. Y.—they were opened to the public something over a fortnight ago—are lighted—and thoroughly so, too—by means of gas. Regenerative burners and the open flame each play their part to the satisfaction of the clerical force and the visitors as well.

THE proprietors of the New Bedford (Mass.) Gas and Edison Light Company have declared a quarterly dividend of 1½ per cent., payable since Friday last, to stockholders of record, March 28.

MR. J. C. L'ENDE, President of the Board of Public Works, recently closed an agreement with the Sun Vapor Light Company, whereby the city of Jacksonville, Fla., becomes the owner of the Light Company's local plant. The Company formerly lighted on city account about 200 oil street lamps.

MR. A. H. BRANCH, General Manager of the Denver (Col.) Consolidated Gas Company, has caused the publication of the following notice: "The Denver Consolidated Gas Company desires to notify its patrons and the citizens of Denver in general that it is about to improve its present plant and system of manufacture by expending $200,000. The improvements are to consist of a water gas plant of the latest and most improved system of water gas manufacture and the extension of its street mains. The water gas plant will be operated in connection with its present coal gas plant, and by mixing the two gases a superior article is produced. For lighting it has no equal and for cooking and heating it will be cheaper to the consumer than ordinary fuel gas at 50 cents per 1,000. After October 1st, 1892, the price of gas will be reduced from $1.75 to $1.50 per 1,000, with the usual reduction of 25 cents per 1,000 to consumers who wish to come to our office and pay their gas bills before the 5th of the month, which reduction will practically make the price of gas $1.25 per 1,000. It will be to the interest of those building to have their houses piped so that they can use gas for lighting and heating and for fuel purposes."

IN the annual report of Mr. J. W. Patterson, inspector of illuminating gas and gas meters for Allegheny county, Pa., which report covers the operation of his office for the year ended March 28, 1892, are many things of interest. He first refers to the provisions of the statutes which regulate his powers, etc., from which we learn that the Gas Companies in Allegheny county are required to furnish a merchantable gas, the illuminating value of which shall not be less than 15 standard sperm candles, and which "shall, with respect to its purity, be *free* from ammonia, sulphur, carbonic acid and other agents detrimental to its purity." We are not possessed of a copy of this gas act; but, taking it for granted that our italicized word is the language of the act, we submit that Mr. Patterson is entirely correct in his finding that while every Company in the county sent out a gas well in excess of the stipulated candle value, he was also obliged to report that "not all have sent out a gas at all times *entirely free* from some of the impurities forbidden by the statute." He then, in effect, goes on to say: "The fact that full candle power was sent out, and that the superintendents were exerting themselves to remedy the evil, influenced me to refrain from arbitrary measures in any case." As an assurance that impure gas is not a general thing, nor a result of negligence or carelessness on the part of the Companies, he refers to the spur that exists to goad on gas makers to make rich and pure gas in the shape of the presence of electric lighting competitors, and asserts his belief that this competition will be sufficient to cause the gas makers to "do their best," or be driven to the wall. Having paid his respects to the gas meter—which he considers to be a much maligned measurer, from the fact that but 46 meters were complained of, out of a total of 18,436 in use in the county, and that the general average of the 46 turned out to be 3.92 per cent. slow, or in favor of the consumer—he sums up his belief in its reliability in these words: "Many sins charged to the meter are due to the gas burner." He makes, however, no mention of the consumer-end of the burner

combination, except we take the words, "And of that the consumer seldom makes any consideration," as a saving clause. Referring to natural gas, the Inspector says: "At the time that the Act creating this office was passed the use of natural gas for fuel and light was not contemplated, while to-day, in Allegheny county, thousands of meters are in use measuring natural gas, sold and used as fuel and light. Under the law this office does not have anything to do with such meters. It is fair to say, however, that within my experience and knowledge none of the natural gas companies have declined to have a meter inspected by me when requested by a consumer, and I believe have always abided by the result of my certificate." The Inspector then gives it as his opinion that natural gas will soon be included in the list of things that were, and having expressed the further belief that a manufactured gas will replace it, goes on to say: "The act of 1869 should be amended to include the inspection of meters used to measure gas sold and used for light or fuel where the contract is at a price per affixed unit and a share of the cost and expense of such inspection (now entirely borne by the illuminating gas companies) be equitably divided. In this connection I may suggest in this county, in direct competition with the illuminating gas companies, are numerous electric light companies, as the Allegheny County Light Company, the Pittsburgh Light Company, the East End Light Company, the McKeesport Light Company, and others, supplying light to the public most of them using meters to fix the charge for their product, not one of them under supervision or inspection of any kind. This state of facts would seem to be so invidious as to warrant grave complaints on the part of the gas companies that they should be subject to the expense and inconvenience of maintaining an entire inspection and provision, while their competitors are not only relieved of this burden, but are permitted to so conduct their business as to make possible any degree of injustice or irregularity in their supply, not only as to the equitable value of their commodity, but also as to the safety of their appliances used—evils from which their patrons and the public have a right to the same protection accorded by the commonwealth in the case of the gas companies, and in this view it seems clear that the law should be amended to provide for the supervision of the supply of electric light. In conclusion, I believe the inspection of illuminating gas and gas meters is limited to Allegheny County in this commonwealth. I beg to have your consideration of the propriety of a general law providing for the inspection and supervision of the gas companies and electric light companies in this State; and I may suggest that if such inspection would not be a public benefit no reason that I know of exists why the Act of Assembly affecting the illuminating gas companies of Allegheny County should not be repealed?"

MR. HENRY RITTER, Chairman of the Gas Committee of the Burlington (Iowa) City Council, informs us that bids will be opened to-day for a supply of gas to 250 or more public gas lamps, and for all the gas needed to satisfactorily illuminate the public buildings, tenders to be made on the basis of a contract for one, three and five years.

EARLY this month the Norwalk (Conn.) Gas Light Company notified the City Council that all the interest of the Company regarding the lighting of the streets of South Norwalk by electricity had been transferred to the Norwalk and South Norwalk Electric Light Company. The communication was referred to the City Attorney, who was also instructed to notify the Gas Company that the city would insist on the fulfillment by it of the contract.

THE largest gas meter in use by any single consumer in Lewiston, Me., is in the Androscoggin Mill. It is a 400-lighter.

ON April 2 the receiver in charge of the operation of the plants of the Pine Bluff (Ark.) Water and Light Company notified the city that unless its arrears to the Company on account of public lighting were not satisfied by the following Thursday (7th inst.), the light—both gas and electric—would be shut off. The city failed to settle, and the receiver did as he said.

THE Selectmen of Wakefield, Mass., having failed to coerce the local gas company, in respect to the terms under which the public lighting of the town was to be carried on, have entered into a contract with the the Globe Gas Light Company, Boston branch, to maintain 100 naphtha lamps, the same to be kept alight each night and all night, and to be paid for at the rate of 6¼ cents each per night. And thus does Wakefield "progress backwards." The town name seems to be a misnomer. Wakefield, indeed! Sleepy-meadow sounds more like it.

F. B. JOHNSON, the moving spirit in the Johnson Fuel Gas Company, was going to raise Topeka, Kas, out of the slough of despond, in respect to furnishing the citizens of that locality with an abundant supply of artificial fuel gas, at rates that would be cheaper than coal fuel, by something like 70 per cent. His process and his methods were to be the "slough of despond" conquerors; but it appears that all that Johnson has so far succeeded in accomplishing is the putting of himself in a very deep hole, and the qualifying of himself for membership in that decidedly select local organization known as the Annanias Club, of Topeka. What other conclusions than these can we reach when we have before us the evidence that on the 30th of March he appeared before the Topeka Board of Trade, and, as President of the Johnson Fuel Gas Company, appealed to the Board for the sum of $10,000 in cash, which sum would enable his Company to keep its stakes down in Topeka for quite a while longer. He said he thought seriously of moving the stakes, cord and canvas of the concern to Des Moines, Ia., the authorities of which place had offered him $50,000 to locate there, from whch we must draw the inference that a Topeka dollar is worth five Des Moines dollars—a condition that ought to raise Mr. Chollar's spirits to a high pitch, even as the reverse of the stipulation would correspondingly depress the ardor of Mr. Pratt, at Des Moines. The Board of Trade, however, permitted Mr. Johnson to remain in the hole.

THE wide awake Manager of the Walla Walla (Wash.) Gas and Electric Company has convinced the proprietors that water power sufficient for the purpose of operating the Company's electric station can be obtained from Mill Creek, which watercourse is about 4 miles above the city. According to our information, the water will be conveyed through wooden mains, 42 or 48 inches in diameter, for about a mile, or to the site where it is proposed to locate the water wheels and additional electric generating machinery, from whence the current will be led, by means of a naked copper wire, strung on 40 ft. poles, to the old power house, where a T.-H. motor will receive the current for the purpose of driving the dynamos, at present moved by steam, that supply the currents to the lamps in use in the city. Mr. Burrows estimates that about 275-horse power can be relied on, and he puts the probable cost of the installation at $50,000. Perhaps Mr. Burrows will, when the busy time of carrying out the scheme is ended, furnish our readers with a description of how the task was accomplished.

THE Virginia and Carolina Heat and Light Company, which controls what is known as the "Acme" gas process for Virginia and the Carolinas, is exploiting the same at North Danville, Va., where a small works has been constructed. As usual, the promoters or exploiters have "secured space" in the reading columns of the local press, and the expert repertorial engineers have discovered many virtues in the Acme gas, in respect of its great illuminating power, its remarkable "fixedness," and its marvelous cheapness. We note, however, that a gallon of crude oil does not yield as much gas at North Danville under the Acme process as was reported from Adrian, Mich., under the same process. For instance, a gallon of crude at Adrian was sufficient for the production of something like 1,200 cubic feet, whereas at North Danville the gallon yields only 500 cubic feet. The candle power, too, seems to have been equal at both places. There is nothing of value in the Acme process, so far as legitimate gas interests are concerned, whether its exploiters select New York or Tishimingo Station, in the Chickasaw Nation.

LOUISVILLE, Ky., asked for additional public arc lights, and the Louisville Gas Company, which holds the contract for the maintenance of the lights now in use (156 in number, the contract to expire on December 31, 1892) refused to put others in circuit unless the contract price was raised to $100 per light per annum—the Company is now paid at the rate of $66 per annum—and also presented the ultimatum that *all* the lights, after January 1, 1893, would have to be paid for at the $100 rate. The city agreed to the terms, and now Engineer Barret veils the other eye.

THE Central Market House, Cleveland, Ohio, is to be lighted by electricity. This is the building in which the occupants of stalls refused to pay rent to the city unless the authorities agreed to remove the oil lamps installed on the refusal of the Gas Company to supply gas at 60 cents per thousand.

CONSUMERS paying tribute to the Edison Electric Light Company, of Chicago, are complaining about the extravagant charges for incandescent lights, the currents for which are measured by the Edison meter.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks,

16 Wall St., New York City.

April 18.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	114	114¼
Central	500,000	50	87	—
" Scrip	220,000	—	95	100
Equitable	4,000,000	100	145	150
" Bonds	1,000,000	—	106	108
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	110	115
Mutual	3,500,000	100	137	—
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern		50	—	—
" Bonds	150,000	—	—	100
Standard Gas Co—				
Common Stock	5,000,000	100	40	45
Preferred	5,000,000	100	91	93
Yonkers		50	112	—
Richmond Co., S. I.	346,000	50	—	—
" Bonds	20,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	113	115
Citizens	1,200,000	20	105¾	106
" S. F. Bonds	320,000	1000	—	103
Fulton Municipal	3,000,000	100	130	132
" Bonds	300,000		102	—
Peoples	1,000,000	10	85	87
" Bonds (7's)	368,000	—	100	—
" " (6's)	94,000	—	100	—
Metropolitan	870,000	100	100	102
" Bonds (5's)	70,000	—	100	—
Nassau	1,000,000	25	140	—
" Ctfs	700,000	1000	99	100
Williamsburgh	1,000,000	50	125	127
" Bonds	1,000,000	—	107	110
Out of Town Gas Companies.				
Boston United Gas Co.—				
1st Series S.F. Trust	7,000,000	1000	88½	89
2d " " "	3,000,000	1000	76½	—
Bay State Gas Co.—				
Stock	5,000,000	50	55¼	56
Income Bonds	2,000,000	1000	6	8
Buffalo Mutual, N. Y.	750,000	100	110	—
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	155	160
" " Bonds	45,000	—	—	—
Chicago Gas Company	25,000,000	100	78¼	78⅜
Chicago Gas Light & Coke Co.—				
G't'd Gold Bonds	7,650,000	1000	90½	91
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1000	—	97½
People's Gas and Coke Co., Chicago—				
1st Mortgage	2,100,000	1000	100	—
2d "	2,500,000	1000	96	—

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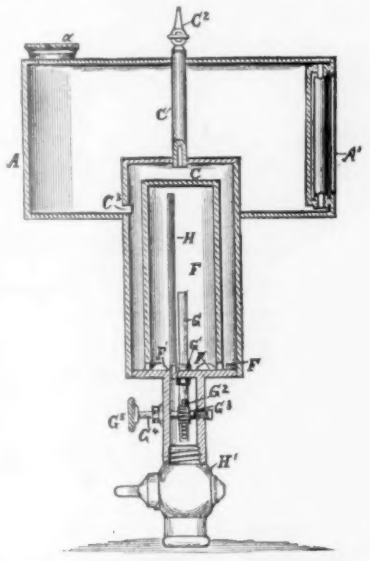

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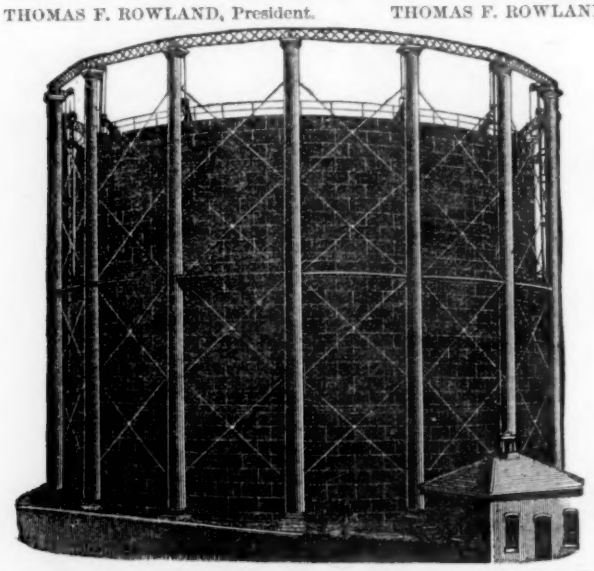

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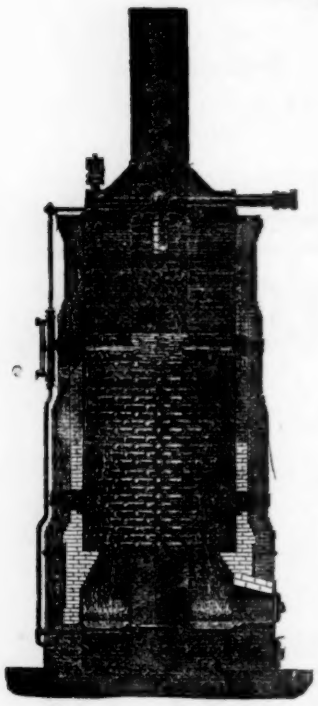

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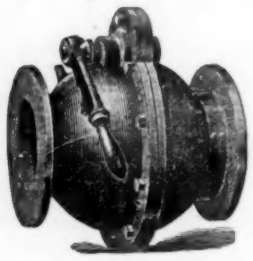

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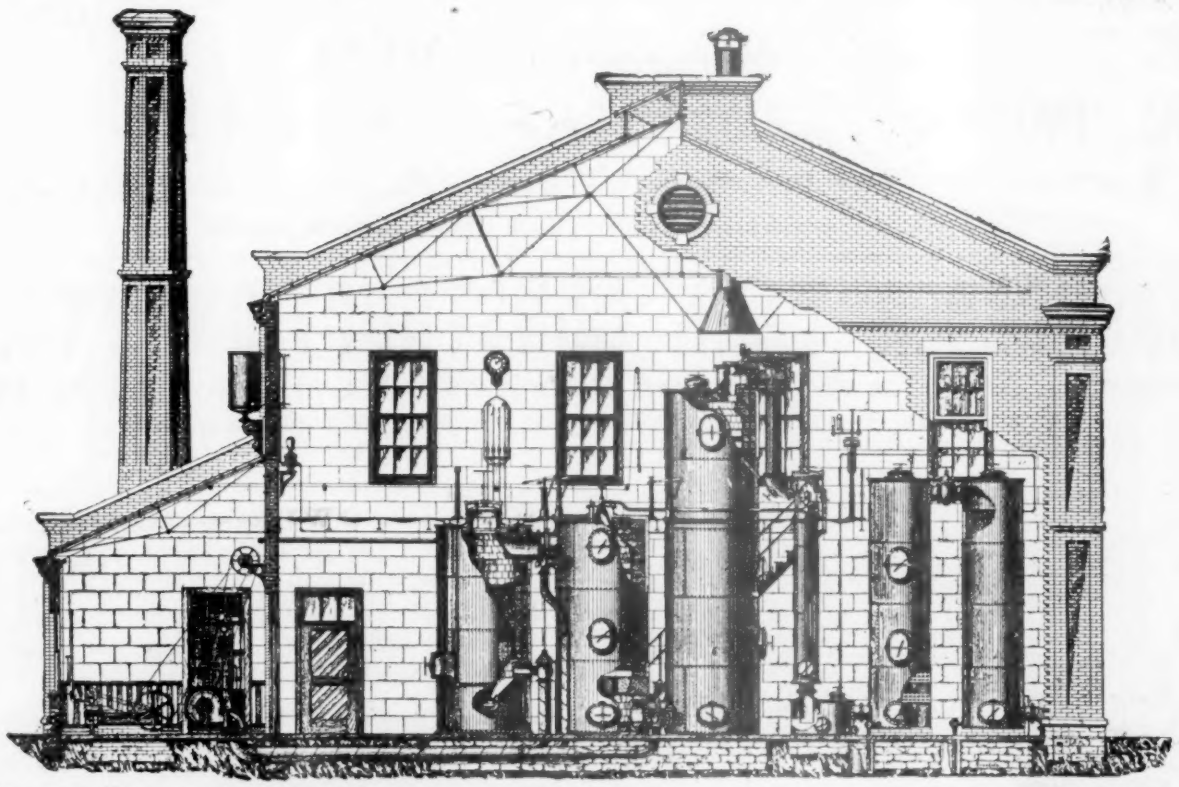

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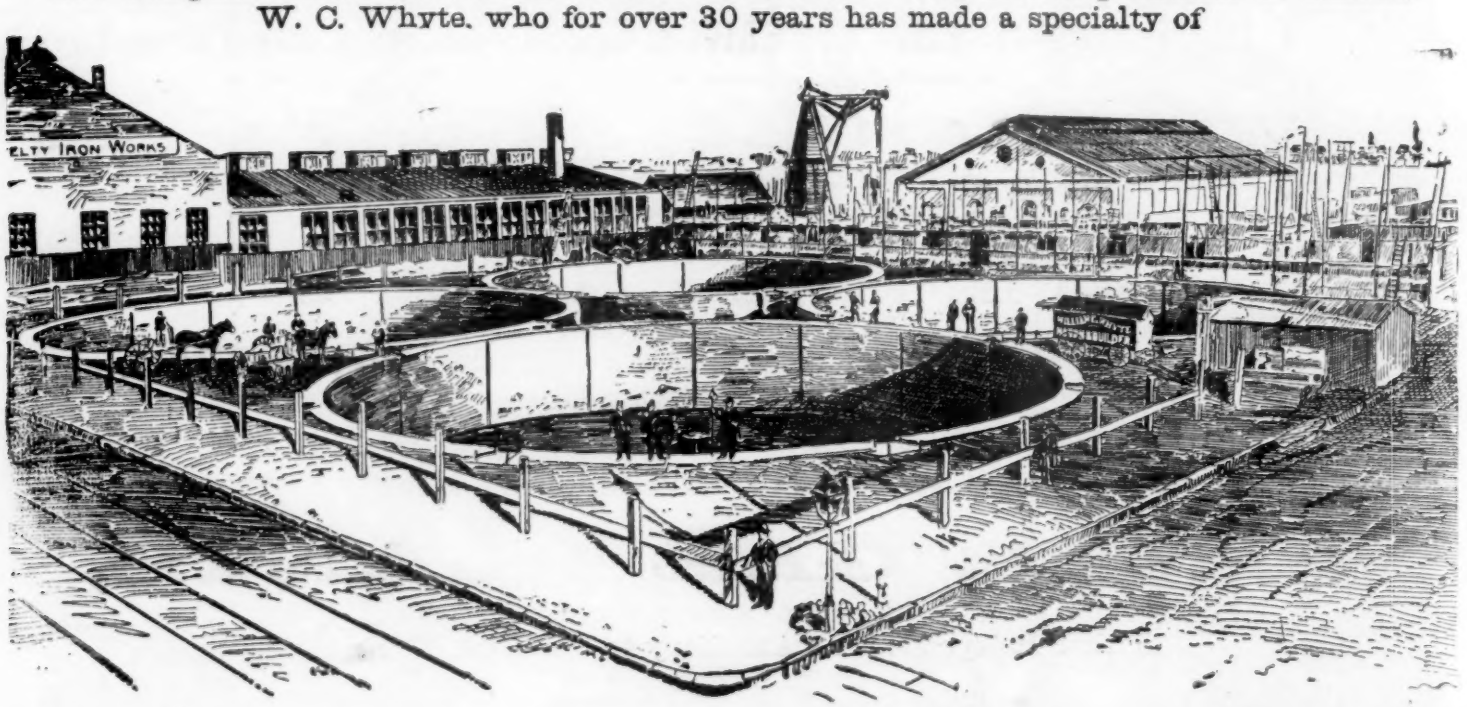

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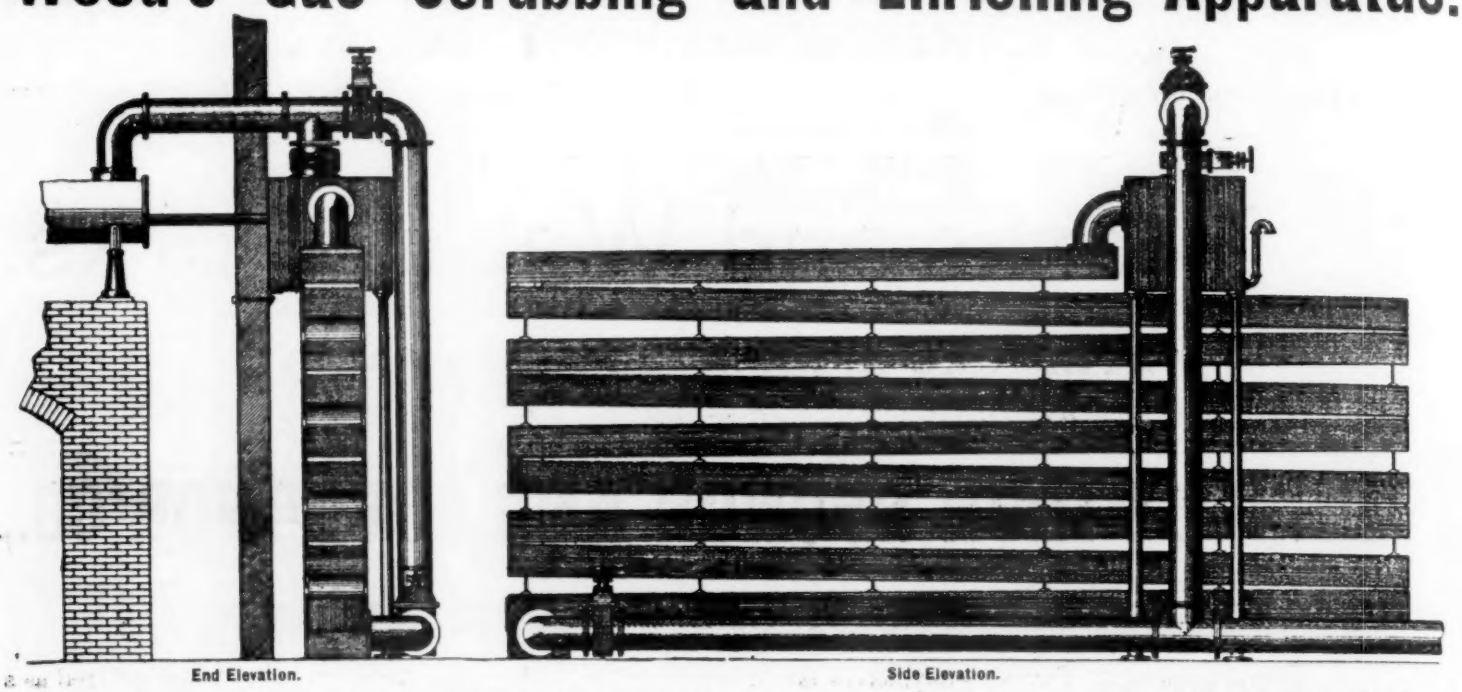

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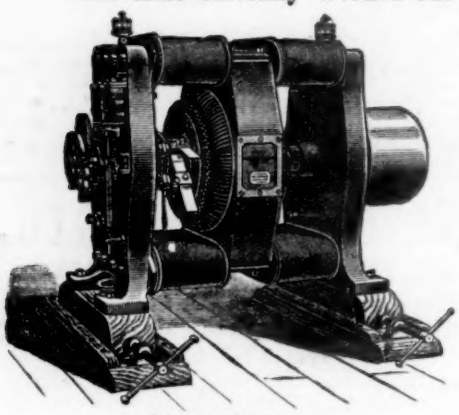

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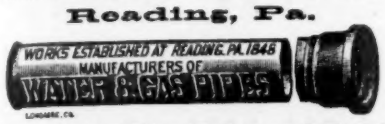

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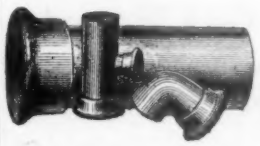

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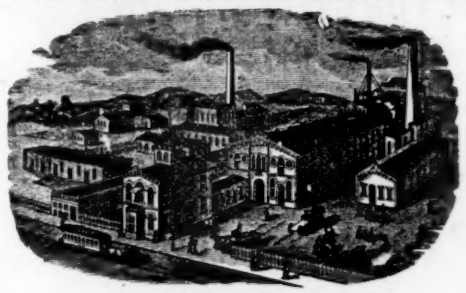

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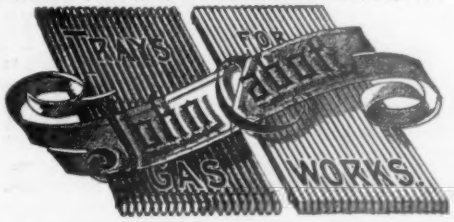

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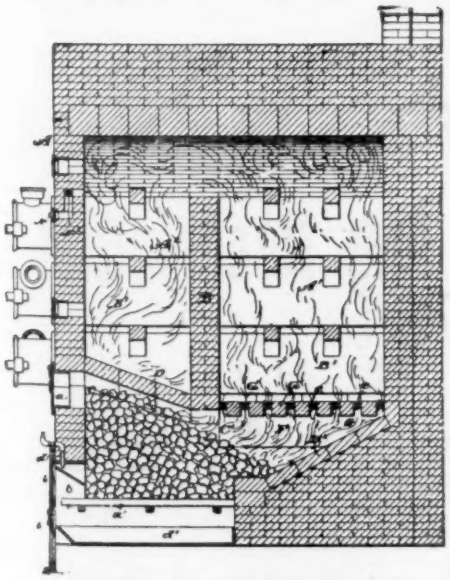

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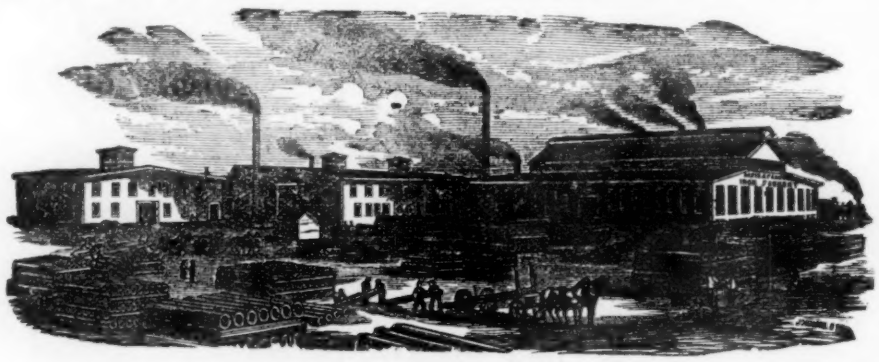

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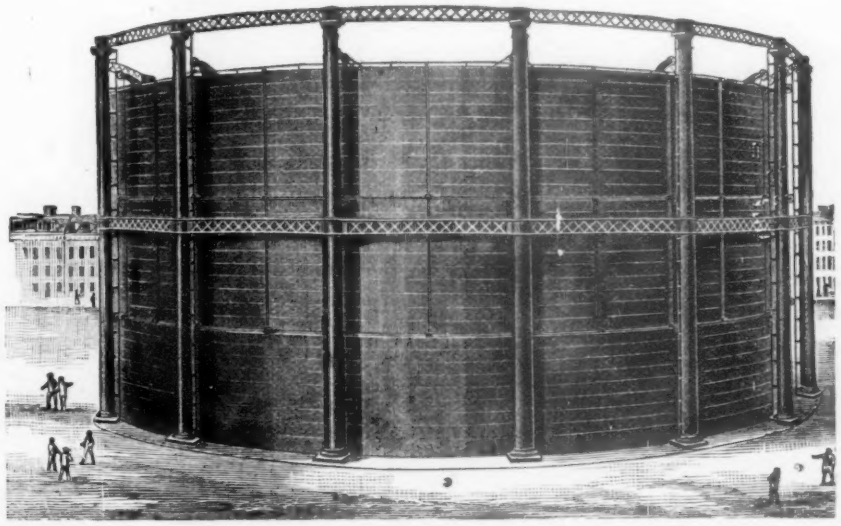

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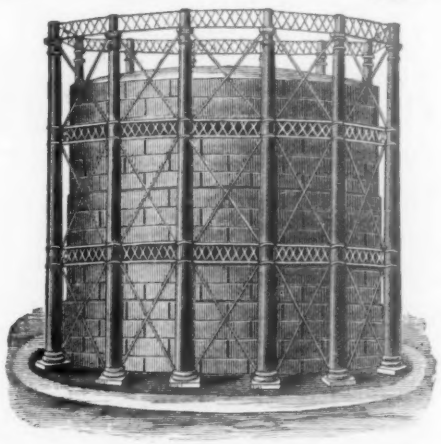

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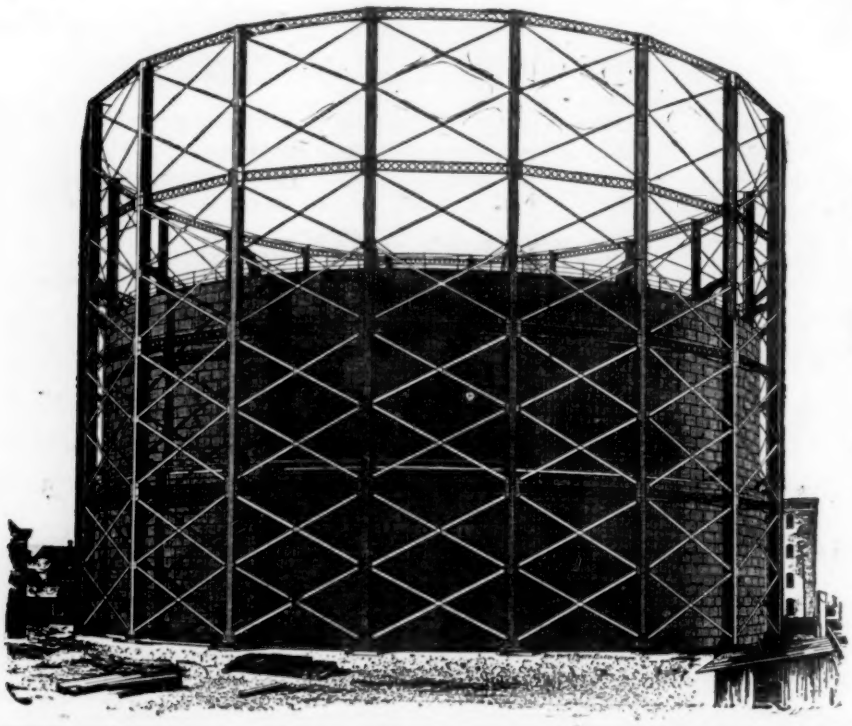

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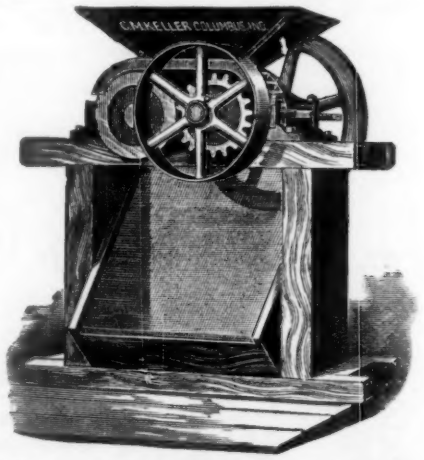

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